Is Meat the Hunter’s Property?

*Big Game, Ownership, and Explanations of Hunting and Sharing*

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**Introduction**

Meat plays a prominent role in popular scenarios of human evolution. One influential view depicts ancestral males hunting to feed their mates and offspring as the keystone adaptation favoring the spread of features that distinguish us from the other apes (e.g., Washburn and Lancaster 1968; Lovejoy 1981; Lancaster and Lancaster 1983; Tooby and DeVore 1987; Fisher 1992; Ridley 1996; Pinker 1997). This story of human evolution locates the origin of men’s work in paternal investment (Trivers 1972). Males in most primate species allocate their reproductive effort largely to mating competition instead of parenting. Any tendency in ancestral human males to shift effort from mating to parental provisioning could only spread if the youngsters a man fed were his own offspring.

But if ancestral hunters targeted large animals, there are good reasons to doubt that a hunter could have maintained ownership of his prey. Among modern tropical foragers, hunters generally do not control the distribution of meat from big animals. Large carcasses are treated more as a communal resource, like a public good from which many claim shares. To the extent this is so, the meat taken by others cannot be counted as part of the hunter’s own gain for his effort, and his own family may get no more meat for his work than others do. A hunter cannot exclude other claimants, nor can he exchange portions of meat with other hunters (or anyone else) for obligations to return meat (or anything else), if he does not own the carcass in the first place.

Here I review data from three ethnographic cases that illustrate this absense of ownership, and discuss implications for both causes and consequences of hunting. Parallels between hunting and meat-sharing among chimpanzees and people are
instructive. In both species hunting is largely a male specialty, and meat is more widely shared than other foods. I compare an initial phase in the treatment of kills by chimpanzees with the ethnographic examples. Although differences are numerous and important, there is this similarity: more often than not no one has exclusive control of the carcass. The initial phase is quite brief among chimpanzees but not among humans. The expansion of this first phase, both in the duration and extent of meat distribution it encompasses, can be related to prey size.

The arguments developed here distinguish two kinds of sharing. One is the mutual use of a resource that is in the public domain; the other is the voluntary transfer of private property among owners. Chimpanzees often have difficulty exercising ownership over whole prey but do establish possession over smaller pieces. Human hunters take prey in much larger sizes. If larger prey size increases the difficulty of exercising ownership, then more of the meat distribution takes place before portions are small enough to be private property. Hunters capturing larger animals contribute increasingly more to the public domain. Consequently, more of the sharing is not exchange (Woodburn 1998).

Paleoanthropologists have long emphasized maximum prey size as a key feature distinguishing human from chimpanzee hunting (e.g., Isaac 1978, 1984, Issac and Crader 1981). Small-animal hunting as practiced by modern chimpanzees may have been within the behavioral repertoire of all hominids. Stiner (in press) argues that regular hunting of large game may not be indicated in the archaeological record until the late middle Pleistocene.

If the ownership arguments here are correct, the benefits spurring ancestral hunters to target larger prey would not include family provisioning. But those who joined or stayed with more successful big game hunters whenever groups split could expect more meat. The benefit to the hunter himself would depend on a reputation for capturing large prey. Those with reputations for supplying bonanzas would attract more allies. With hunters competing to establish reputations, claiming shares of meat would be a more frequent and rewarding activity for all. Any increased capacity to use conventions to settle contests with reduced conflict costs would be favored as a consequence (Stanford this volume). If Stiner is right about the late dates for large-animal hunting in the archaeological record, then these things may be implicated in the radiation of “archaic” *H. sapiens*.

**Ownership**

The distinction between sharing that goes on in the absence of ownership and sharing by owners focuses attention on the diagnostic feature of “ownership” and “property” traditionally used in economics (Barzel 1997). Owners have the right of exclusive use and the right to voluntarily transfer their ownership to someone else. This right to exclusive use distinguishes private from public goods. Goods that one cannot exclude from consumption by others are public goods; those that one can keep for exclusive use are private property. Because excludability is more continuous than discrete, few goods are perfectly private or perfectly public. But some are
relatively easy to exclude from other users and some are extremely difficult, the costs of exclusion too high to be worth paying.

The cost of exclusion is central to the idea of economic defendability (Brown 1964) that has proven so useful in behavioral ecology and supplies the logic of Blurton Jones' model of tolerated theft (1984, 1987). This model points to a variable that could explain why two phases can more often be distinguished in the sharing of meat than other foods. Game animals come in packages larger than most nongame resources, packages that are large relative to the portion size that one individual (human or chimpanzee) can consume. To get any game meat at all a hunter must down the whole animal. One kilo of kudu may be plenty, but the rest of the kudu comes with it.

Any forager may anticipate large benefits from consuming that first portion (or feeding it to an offspring) and may also anticipate that their own consumption benefits (and those of their children) will begin to diminish long before they have eaten everything. Because the hunter must kill the whole animal, the many portions equal in size and quality that become available when the prey is down will have different value to different potential consumers. The same portion will be worth less to one who has already claimed some. The cost of successfully claiming and defending any portion against other contestants depends on the pressure they apply, which, in turn, depends on the value that portion has for others. Division and distribution can thus continue until no one values a portion they do not already hold more than the cost they would have to pay to successfully contest it. At that point, portions are private property: owners can exert exclusive control, consuming them directly or trading them for other goods and services.

This schematic picture is a cartoon, picking out a small handful of variables from the many that must affect real behavior. The purpose of such a simple model is to see whether a few variables could account for systematic variation in others. If economic defendability plays an important role in food-sharing, then resources that are initially acquired in defendable units are not subject to this first phase of sharing. The cost of excluding other claimants from these resources is worth paying from the start. Any sharing is then under the control of the owner. But resources that are acquired in units too large to be successfully defended will initially be divided and distributed as multiple claimants seek shares. No one will be able to control this distribution. Only after enough division results in economically defendable holdings can holders control transfers of their own property.

**Meat-Sharing among Modern Human Foragers**

Ethnographers have drawn attention to the distinctive ways that people make claims on many resources, including meat, in egalitarian foraging communities (e.g., Erthal and Whiten 1994). Classic characterizations note that claimants do not say "please" or "thank you." Ethnologists interpret the absence of expressions of gratitude to indicate that claimants see shares as their due (Lee 1969; Sahlins 1972). Sometimes claims have an edge of threat. Hunters are often described as "owners" of a carcass, but the label is not used to mean the right of exclusive use (Wiessner 1996).
Other users cannot be refused. Peterson (1993) has labeled such ethnographic patterns as “demand sharing.”

The Hadza

Hadza hunters of northern Tanzania (Blurton Jones et al. 1992) specialize in taking big game, and meat is widely shared. Hadza hunters can and sometimes do set snares and take small animals, but usually they do not pursue small prey while hunting, even though they encounter them often. The smallest of the game they regularly take has an adult body weight of about 40 kg. Over a sample of more than 2,000 hunter-days the large prey regularly taken by hunting and competitive scavenging in this population have an average size of 143 kg (live weight) (O’Connell et al. 1988; Hawkes et al. 1991).

Among the Hadza the “demand” style is common. Insistent claims are especially audible at kill sites. Arguments sometimes break out about shares and their size. Claims, not just by men but by women as well, often take the form “where’s mine?” The successful hunter is in no position to “relinquish” shares (cf. Hawkes 1993b; Hill and Kaplan 1993) because he does not control them in the first place (Barnard and Woodburn 1988; Woodburn 1998). Neither he nor anyone else tries to exclude other users, except from the share he takes himself.

A sample of 113 shares from 20 large prey weighted at Hadza men’s households (Table 11.1, row 1) shows that the successful hunter does not generally get a larger share of the meat. Household share sizes vary widely. They increase with prey size, but so the number of claimants. In this sample residents got shares from only the very largest prey taken by hunters living elsewhere (Table 11.1, row 2). For very large prey (>180 kg), the hunter’s household got a larger share (Table 11.1, row 3a). For prey less than 180 kg the hunter’s share was no larger than that of other men (Table 11.1, row 3b). The household share sample included a disproportionate number of the very largest species, an average of 288 kg/prey compared to 143 kg/prey for our total sample of 71 large prey. In the larger sample, 49 of the 71 prey (69%) were less than 180 kg. The sharing sample supports the inference that about 30% of the time (when the prey weigh more than 180 kg) the hunter’s household got about 10% of the meat and other men about 5%. More often, when the prey weighed less than 180 kg, both got about 5%.

While the carcass is not owned by the hunter, the shares transported home—the household shares—are better candidates as private property. But there can still be further division by demand. Visitors arrive from other camps on news of a large kill to “help eat meat” and sometimes depart carrying portions. These might be voluntary transfers, the householder trading meat for something else. But nothing indicates he could successfully refuse.¹

The Ache

The biggest quantitative data set on meat-sharing comes from the Ache of Eastern Paraguay (Kaplan 1983; Kaplan et al. 1984; Kaplan and Hill 1985; Hill and Hurtado
Table 11.1. Hadza household shares of big game.

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>mean</th>
<th>SE</th>
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</thead>
<tbody>
<tr>
<td>1. Weight of edible tissue/household w/resident man measured in household share sample</td>
<td>113</td>
<td>13.6</td>
<td>1.2</td>
</tr>
<tr>
<td>2. Size of prey (edible portion)</td>
<td></td>
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<tr>
<td>Difference of means (unequal variances) p = 0.85</td>
<td></td>
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<tr>
<td>a. Hunter a coresident man (boys excluded)</td>
<td>13</td>
<td>114</td>
<td>25.5</td>
</tr>
<tr>
<td>b. Hunter living elsewhere</td>
<td>4</td>
<td>285</td>
<td>95.3</td>
</tr>
<tr>
<td>3. Hunter a coresident man (boys excluded)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. prey &gt; 180 kg, diff. of means p = 0.014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hunter's household</td>
<td>8</td>
<td>29.9</td>
<td>5.1</td>
</tr>
<tr>
<td>other men's households</td>
<td>38</td>
<td>13.5</td>
<td>1.2</td>
</tr>
<tr>
<td>b. prey &lt; 180 kg, diff. of means p = 0.389</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hunter's household</td>
<td>7</td>
<td>2.2</td>
<td>0.8</td>
</tr>
<tr>
<td>other men's households</td>
<td>21</td>
<td>3.8</td>
<td>1.0</td>
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<tr>
<td>4. Large animals in household share sample</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>a. estimated carcass weight</td>
<td>20</td>
<td>288</td>
<td>57</td>
</tr>
<tr>
<td>b. estimated weight of edible tissue</td>
<td>20</td>
<td>173</td>
<td>34</td>
</tr>
<tr>
<td>5. Total large animal sample</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. estimated carcass weight</td>
<td>71</td>
<td>143</td>
<td>19.4</td>
</tr>
<tr>
<td>b. estimated weight of edible tissue</td>
<td>71</td>
<td>85</td>
<td>11.6</td>
</tr>
</tbody>
</table>

From Hawkes et al. in press. Weights (kg) of carcases acquired and shares of edible tissue distributed to households with resident men. Columns list sample size (n), sample mean, and standard errors. Total carcass weights taken from Coe et al. (1976), with carcases acquired by scavenging estimated at 80% of mean value per taxon. Weight of edible tissue estimated at 60% of total carcass weight. Weights of 113 household shares measured with hanging spring scales plus some estimated portions. “Other men” (rows 5 & 6) are those who did not make the kill. Difference of means are unpaired t-tests, one-tailed significance.

1996). The Ache take the largest game available in the Neotropics, but those they encounter in any frequency are about the size of the smallest taken by the Hadza. About 83% of the meat that Ache women and children eat comes from shares of the kills made by men who are not their husbands and fathers (Kaplan and Hill 1985). Not only is meat very widely shared among the Ache, but, as with the Hadza, hunters play no proprietary role in meat distributions (Kaplan et al. 1990). Usually an older man takes on the final carving of cooked meat, and all watch as he distributes shares. Observers comment on portion sizes, and agreement among vocal critics directs adjustment. The successful hunter has no special opportunity to control the size or direction of portions.

The Ache are explicit about the virtues of sharing. Because it is extremely impolite not to share, and in the forest² people usually eat in very close proximity, it is difficult to say when a portion of meat becomes someone’s property. Children are sometimes teased to give up a piece of food they are consuming with relish. No systematic study has been done of such incidents, but episodes can end with most of the piece (or another) returned to the child. Does the child have the owner’s discretion to give or not? One interpretation is that the child’s exclusive control is temporarily violated for a lesson in manners, perhaps even reciprocity: share with others,
and they will share with you. To the extent there is individual discretion about whether to give or not, it comes after the meat has been distributed.

The !Kung

The !Kung of the northern Kalahari take the same large animals that the Hadza do, but ungulate densities and hunting success rates are lower there, and hunters do not specialize in big game (Lee 1979). Small animals belong to the hunter. For large ones there is a nominal owner, the owner of the arrow that first penetrated the animal, who may or may not be the hunter who took the shot (Marshall 1976; Lee 1979). Marshall (1976) describes the role of this person who carries out some of the distribution but cannot control the destination of shares. This “owner of the animal” may “start off the distribution in the direction of his own relatives.” But that distribution is followed by further sharing to include “visitors, even though they are not close relatives,” and finally “everybody gets some meat.” Marshall emphasizes the many “waves of sharing” (1976: 297ff). Only after repeated division and distribution are the portions under the exclusive control of individuals. Then, she reports, “when an individual receives a portion of meat, he owns it outright for himself. He may give and share it further as he wishes . . . [P]ossessing one’s piece personally . . . gives one the responsibility of choosing when to eat one’s meat and struggling with hunger the best one can when it is finished, without occasion or excuse for blaming others for eating more than their share” (1976: 302). It is only after the “primary distribution and primary kinship obligations have been fulfilled” that a share is private property and subject to the exclusive use of its owner. Then, “the giving of meat from one’s own portion has the quality of gift giving. . . . The person who has received a gift of meat must give a reciprocal gift some time in future” (1976: 299, emphasis added).

Behavior around the distribution of meat differs in these three ethnographic cases, but in none of them can the hunter, or anyone else, exclude others from shares of a carcass. Among the Ache and !Kung, as among the Hadza, the hunter has no opportunity to control the size or final destination of shares. Only after division and distribution when he controls a share himself could he exchange it for something else. Like anyone else, he can only trade or exchange the portion that is his private property.

Among the Hadza and the !Kung, this absence of control by the hunter applies to large prey, but not small. In the Ache case, even small animals are subject to wide distribution. Perhaps the very tight clustering of people in Ache foraging camps helps explain this. Parties usually camp in the same place for only a single night (Hill et al. 1987), so clearing is not extensive and people are almost within touching distance of all members of the party. When meat is cooked, all members of the camp participate in the same meal. The Ache are adept at dividing even small monkeys into many pieces. Still, not everything is as widely shared. The relationship between package size and the fraction that the acquirer keeps holds across Ache food resources. Even small animals are larger than most plant foods, and the fraction of a resource shared by those outside the acquirer’s nuclear family is correlated with package size (Kaplan and Hill 1985; Hawkes 1991).
Chimpanzee Meat-Sharing

Although chimpanzees have been observed to take other prey, they are effectively specialists on colobus monkeys. Mean weights of these prey range from 4.7 to 8.7 kg across three study sites (Stanford 1996). What happens after a chimpanzee hunter captures a monkey has been described by many observers (e.g., Teleki 1973; Goodall 1986; Boesch and Boesch 1989; Wrangham and Riss 1990; Nishida et al. 1992; Uehara et al. 1992). Adult males near the prey rush to seize it. If the initial holder is not the alpha, other males threaten, grab, and sometimes rip the carcass apart. Observers report the extent of aggression displayed here differs depending on the dominance ranks of the males present (W. McGrew and C. Stanford pers. comm.) and among study sites (C. Boesch pers. comm.).

After the initial division aggression is very rare, but clusters of beggars surround those holding portions. The clusters persist sometimes for the hours over which the prey is consumed. During this time possessors may refuse or ignore supplicants. They may allow mutual feeding on the same piece, or actively proffer pieces. Sometimes possessors, having fed for awhile themselves, relinquish the entire remains. Although those holding portions seem able to exclude beggars, the insistent pressure to transfer shares can sometimes seem quite intense. Goodall describes “occasions when the solicitations of begging chimpanzees made it all but impossible for the possessor to feed; at the very least, they are a source of irritation” (1986: 373).

The aggression in the first phase of meat-sharing among chimpanzees is clearly different from what happens initially among human foragers with a large carcass. Although there may be palpable tension, actual physical aggression among claimants is as rare with humans as it is common among chimpanzees. This is an important difference. There is also an important similarity. None of the multiple claimants initially dividing the carcass has discretion over the disposition of shares. In this sense the first divisions are like the scramble competition of many feeders in a fruiting tree. While one individual may have located the bonanza and called others to it, the finder cannot control what or how much others eat, except as one of the claimants taking a share for himself.

Among chimpanzees, the first phase before possession is established is relatively brief. The following phase, in which possessors seem to have control over whether and to whom they transfer ownership of shares, can be extremely lengthy. On grounds of meat ownership, the first short phase among chimpanzees is similar to most of the sharing among humans: a process of multiple claims on a common resource. On those same grounds, the lengthy second phase among chimpanzees, when individuals control shares and can transfer that control or exclude others, is similar to what happens after most of the division is complete among humans: portions of meat are treated as private property.

Social Implications of Prey Size

The picture drawn here highlights similarities between the initial contest for control of prey parts among chimpanzees with the initial divisions and distributions of
“waves of sharing” of big animals among human foragers. The protracted “begging circles” of chimpanzees are, on these dimensions, similar only to what happens with humans after the “waves of sharing,” which encompass most of the substantial division and distribution. In the begging circles, participants seem to obey an ownership convention, as if the meat were the property of the possessor who has discretion about whether and to whom to allow shares. Similar latitude about whether and with whom to share emerges in the human cases only after the widespread distribution is over.

Paleoanthropologists have long noted that the difference in prey size targeted by chimpanzees and people must have substantial social implications (e.g., Isaac 1978). The ownership issue highlighted here provides a basis for speculating about those implications and their evolutionary consequences.

Among chimpanzees, prey are very rarely larger than 10 kg (Stanford 1996), but a package less than half that size is still large enough to attract the excited attention of all the chimpanzees in a party. Bigger animals taken by human hunters are even stronger magnets. In Hadza country, even without news from human travelers, the signpost of circling vultures would draw a crowd. The larger the resource piles and the greater the number of interested consumers, the smaller fraction of the total anyone can economically defend. Among the Hadza, household share sizes go up with prey size but not isometrically. The bigger the carcass, the more shares are claimed (O’Connell et al. 1990; Hawkes et al., unpublished).

Where chimpanzees tear prey into a few pieces, a kilo or less each, humans must divide much larger prey many more times to reach even a household share size. I have argued that in one important way division at least to this size is like the initial division that chimpanzees use aggression to accomplish. In both cases multiple users claim shares of a resource from which no one can exclude them.

**When Sharing Is Joint Appropriation from the Public Domain**

The costs and benefits of exclusion determine economic defendability. If the costs of a contest are greater for some, those for whom it costs less can net a benefit by claiming more (Blurton Jones 1984, 1987; Winterhalder 1996). Models based on these variables do not necessarily predict that multiple contestants will fight over a resource. Those who can anticipate both the appetites and contest capacities of others will do better to refrain from fights that they cannot win. Simple models thus predict that struggles are more likely among those most evenly matched. Among chimpanzees, it is the adult males who participate in the initial tug of war over a carcass. Females and young males, who would surely lose, do not.

But this does not mean that economic defendability can only account for distributions when the bigger and stronger take all and the smaller and weaker get none (cf. Kaplan and Hill 1985; Hawkes 1992). Pressure need not be physical to be an effective contest tool. People everywhere use associations with close kin and allies to improve their bargaining position, a tactic that is not restricted to humans but widely employed among the primates (e.g., de Waal 1982; Aureli et al. 1992). Small juveniles can decrease their cost of engaging in a contest (and increase the cost to
those who treat them unfavorably) by crying to mother. These tactics would be no match for physical aggression, but they are often employed, perhaps when physical aggression would clearly be ineffective or especially costly.

When both benefits and costs are potentially high, contestants who are more or less evenly matched can earn substantial net gains over a series of contests by using a convention that settles the matter without the cost of actually fighting (Maynard Smith 1982). If some initially arbitrary asymmetry cues a conditional response, for example, give way to the one on your right, then strategies are coordinated, reducing or eliminating the contest costs. Such coordination is self-enforcing: a slight initial tendency for anyone to bias their response according to such an asymmetry increases the gains for others doing so. Gains for obeying the convention and costs for flouting it increase the more often it is used (Sugden 1986). If meat-sharing is subject to these costs, then larger prey size increases the payoff for following conventions (see also Stanford this volume). Larger prey size has this effect because the bigger the pile of meat, the more potential consumers are drawn to the bonanza. More claimants could raise the cost of making a claim, a cost even higher if some are armed. When large animals are taken, tendencies to use conventions to divide and distribute the meat would be much more strongly favored than otherwise.

**Big Game Makes Hunting More Important to All**

The arrival of meat in very large packages increases the payoffs for using conventions to settle contests. The same thing makes hunting an activity of much greater interest and importance in the human than in the chimpanzee case; more individuals can expect to gain more nutritional benefit from any hunter’s success. The success rates for chimpanzee hunters represented by the Gombe population [0.037 prey/hunter/day (Wrangham and Riss 1990)] are arrestingly close to those for human big game hunters represented by the Hadza [0.034 prey/hunter/day (Hawkes et al. 1991)]. But, because of the difference in prey size, Hadza hunters with success rates essentially identical to those of chimpanzees make about thirty times the amount of meat available for consumption that chimpanzees do.

A shift toward larger prey makes successes generally more important because more consumers can expect to get more meat, and for another reason as well: Prey size and encounter rate are inversely related (Table 11.2). When Hadza hunters are induced to take small animals, their success rates are 12 to 42 times higher than they are for big game (Hawkes et al. 1991). The relationship between prey body size and success rates is evident even within the suite of large animals Hadza hunters regularly target. Fewer animals in the very largest body size range are taken (O’Connell et al. 1990). This inverse relationship between success rate and prey size is evident in other samples as well (Table 11.2). Ache hunters, for example, capture an average of 0.66 prey/hunter/day in the size range under 10 kg. For prey from 20 to 40 kg the Ache rate falls by an order of magnitude. The two largest prey species sometimes captured by Ache hunters (Hill and Hawkes 1983), capybara (avg. 60 kg) and tapir (avg. 150 kg), are taken so rarely that no captures occurred over an observation period of 674 hunter-days (Hawkes et al. 1982). Interest in a
Table 11.2. Prey size and hunting success rates.

<table>
<thead>
<tr>
<th>Case</th>
<th>Prey Weights (kg)</th>
<th>Average Success Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ache</td>
<td>&lt;10</td>
<td>0.66 prey/hunter/day</td>
</tr>
<tr>
<td></td>
<td>20–40</td>
<td>0.06 prey/hunter/day</td>
</tr>
<tr>
<td>Ache</td>
<td>&gt;40</td>
<td>&lt;0.001 prey/hunter/day</td>
</tr>
<tr>
<td>!Kung</td>
<td>&lt;10</td>
<td>0.17 prey/hunter/day</td>
</tr>
<tr>
<td>!Kung</td>
<td>&gt;10</td>
<td>0.05 prey/hunter-day</td>
</tr>
<tr>
<td>!Kung</td>
<td>&gt;40</td>
<td>&lt;0.01 prey/hunter/day</td>
</tr>
</tbody>
</table>

"over the long run a ![Kung] hunter averages only two or three large antelope a year" (Lee 1979)

Hadza | <10     | 1.21 prey/hunter/day  |
Hadza | <10     | 0.23 prey/hunter/day  |
Hadza | >40     | 0.034 prey/hunter/day  |
Hadza | >40     | 0.022 prey/hunter/day  |

*Table 11.2. Prey size and hunting success rates.*


Hunter’s success is thus doubly magnified by a shift toward larger prey: the bonanzas are bigger and garnered less often.

These are reasons why others would be more interested in successful hunters who target larger prey than small. Any man choosing to hunt small game or to gather plant foods instead would be successful more often, but he could control most of those resources from the start, leaving little for others to claim. The preference for association with hunters who take large animals hypothesized here arises because the hunter does not own the carcass and so cannot control the initial division and distribution of shares. No one can rely on his unpredictable successes, but many expect to gain from them (Hawkes 1990). By this argument others choose to join or stay with him because of the connection between him and chances to claim meat. Men may thus be hunting to show off this connection, to build and maintain their reputations as a valuable neighbors and allies (Hawkes 1991, 1993b).

**Hunting Reputations**

Men do earn reputations for their hunting, and good reputations earn preferential treatment in all three of the hunter-gatherer examples. Among the Hadza, better hunters are married to harder working wives (Hawkes et al. in press). This, combined with the fact that differences in the nutritional welfare of children are associated with differences in the foraging efforts of their mothers and grandmothers (Hawkes et al. 1997), suggests that better hunters are more likely to marry women who are more successful mothers. Men with better hunting reputations are married to women who have children faster and have more surviving children (Blurton Jones et al. 1997). Such men also are married to younger (and so more fertile) women (Blurton Jones et al. 1997), suggesting that with better hunting reputations they may
be successful at repeatedly displacing other suitors for the most fertile women. The hypothesis that people preferentially associate with better hunters, choosing to side with them or join them because in their company there will be more public meat, implies an advantage for men with better hunting reputations when social divisions arise. According to this hypothesis, the mating advantages of better Hadza hunters result from greater deference to them from others, including men with poorer hunting reputations.

In the case of the Ache, where marriages dissolve much more frequently than among the Hadza (Blurton Jones et al. 1997), hunting reputation has a large effect on a man’s fertility but only a weak effect on the survivorship of his children (Hill and Hurtado 1996). This is consistent with the hypothesis that others are more tolerant of the sexual adventures of better hunters. Because they are desirable companions for other reasons, both men and women may allow better hunters to more often displace competitors as current husbands to the most fertile women.

Among the !Kung, marriages are much less fragile than among the Ache, and although there are exceptions (Shostak 1983), extramarital sex is much less common as well. Hunting reputation still has a large effect on social standing. In a habitat where hunters usually bag no more than two or three large antelope in a year (Lee 1979), the hyperbole that Thomas (1958) captures in her description of one influential man indicates the value placed on hunting success. “... [I]t was said of him that he never returned from a hunt without having killed at least a wildebeest, if not something larger. Hence the people connected with him ate a great deal of meat and his popularity grew” (1959: 182).

In all these cases people place a high value on meat. So a reputation for supplying it attracts favorable attention. But at the same time hunters do not own their prey. So they cannot merchandize it. In criticizing elements of the argument that meat is like a public good in these cases, Hill and Kaplan (1993) compared the meat a hunter does not eat to color TVs the manufacturer does not watch, arguing that in both cases producers are motivated by the exchange value of their products. The manufacturer who owns the color TVs can transfer that ownership in exchange for something else. But if the evidence and arguments assembled here are even partially correct, this does not apply to the hunter. A different parallel between television and meat might. Like an advertiser paying for the production of a program on the public airwaves, the hunter provides a common good. The advertiser’s own payoff, like the hunter’s, comes from getting the attention of an audience. Viewers do not pay the advertiser to watch the show. Yet large advertising budgets attest to the benefits advertisers expect to accrue from the attention they get. They decide how to place their adds to maximize audience effects. So, the hypothesis is, hunters allocate their time to large animals for the same reason. Like the advertiser, the benefits to the hunters increase the more consumers can be drawn to the public good they supply.

If hunters owned their kills, then hunting might be like many other productive activities in which the producer’s gain comes from consuming the product directly or from trading it for other goods and services. To the extent that large carcasses are more public than private goods, hunting them does not give hunters ownership rights. Sharing meat from large prey is not exchange (Woodburn 1998). This di-
rectly challenges the contrary proposition that meat-sharing is largely explained by reciprocal altruism (e.g., Cosmides and Tooby 1992). If kills are not the hunter’s property, his gain is not in meat but in his reputation for supplying it. Although the hunter cannot own the meat, he can own the credit for it.

Practices like those of the !Kung in which the nominal ownership of a large animal is assigned to the owner of the first arrow to penetrate the animal illustrate a key point in this argument about property rights. The owner of the arrow may or may not be the hunter who shot it. Marshall observes that by this practice “the society seems to want to extinguish in every way possible the concept of the meat belong to the hunter” (1976: 287). Owning the meat is one thing; credit for the kill is something else. Men talk endlessly about hunts and hunting (Marshall 1976; Lee 1979), rehearsing the “minutest details.” Lee (1979) was able to collect lifetime retrospective histories from !Kung men in which each participant enumerated all the large animals he had killed in his lifetime. Hunters themselves, and all those who listen to the storytelling, know who it was that shot the arrow.

### The Storytelling Problem with Big Game Hunting Reputations

Although the success rates of Hadza big game hunters and chimpanzee monkey hunters at Gombe are strikingly similar, the direct experience of hunting success to the human audience is different from the direct experience of the chimpanzees. Among chimpanzees, hunters are members of temporary parties all traveling together. Hunting frequency is directly related to the size of that temporary group. The larger the party, and especially the more estrous females it contains, the more hunting observed (Stanford et al. 1994). Only individuals on the scene of the hunt (and relatively few of them) get meat.

By contrast, when people hunt large prey, consumers get meat whether or not they witnessed the kill. Large carcasses continue to be attractive to claimants long after butchery has begun. Among the Hadza, men women and children converge on kill sites to eat and to transport meat. The transported portions are themselves often large enough to attract more claimants. Most consumers arrive at the meat long after the death of the prey. A hunter’s success may not be directly observed by anyone else and if it is, not by the same audience who saw the last one.

In the modern human cases discussed here, large game captures are rare (Table 11.2). Among the Hadza and the !Kung, hunters look for opportunities to strike large prey on encounter with poisoned arrows. The typical pattern is that hunters alone or in pairs travel in search of encounters with prey (Lee 1979; Woodburn 1968). Hadza hunters also use ambush tactics in the dry season, sitting in blinds (again, as singles or sometimes in pairs) on game trails or near water waiting to prey on species that visit the restricted points of surface water (Hawkes et al. 1991). Their success rates depend most obviously on the density and behavior of prey and on technology. Large-game densities in Hadza country through the 1980s were in the range predicted by annual rainfall in the arid East African tropics (O’Connell et al. 1988). Pleistocene densities in this region may have been higher, with hunting success rate increased accordingly. On the other hand, the absence of weapons
as efficient for taking large ungulates as the bow and arrow would have lowered
the success rates of ancestral hunters compared to the modern Hadza.

If we take the modern rates as a provisional estimate for rates in the past, they
indicate substantial constraints on reputation building. Successes are too rare, and
more important, they happen elsewhere too often, for any observer to rank hunters
on the basis of direct visual experience. Only the pooled experiences of many, com-
bined in telling and retelling stories of hunts recent and past, could identify and
rank the cumulative success of individual hunters. If it is not meat but reputation
that draws men to hunt big animals, and if reputations require story telling, then
big game hunting would only spread and persist among members of our lineage
with the capacity for language.

What of Early *Homo* and Lower Paleolithic Archaeology?

If big game hunting is a common practice only with the appearance of “archaic”
*Homo sapiens*, what of the earlier members of our genus, especially *Homo erectus
(ergaster)* (Wood and Collard 1999), a taxon displaying changes in body size, matu-
ration rates, and geographical distribution long attributed to increased carnivory
and specifically familial provisioning by hunting fathers? By the arguments here,
the appearance and spread of genus *Homo* and all the archaeology of the Lower
Paleolithic including evidence of associations between early humans and the re-
mains of large animals must predate the appearance of regular large game hunting.

That possibility seems less remote with the result of recent work focused on plant
foraging strategies (Schoeninger this volume; Sept this volume) and the life his-
tory consequences of a shift to plant resources that young juveniles cannot handle
for themselves. Among chimpanzees, as with other nonhuman primates, youngsters
feed themselves at weaning. Human children can be surprisingly energetic foragers
at young ages (Blurton Jones et al. 1989), but they still depend on others for
most of their diet after they are weaned. Linking these differences to recent model-
ing in life history theory suggests that a suite of changes including delayed matura-
tion, increased body size, increases in longevity, and modified digestive anatomy
could all have been systematic consequences of increased reliance on plant foods,
like deeply buried tubers that young juveniles cannot handle for themselves (Hawkes
et al. 1998; O’Connell et al. 1999). Many tubers, especially if they are cooked, can
provide a rich and abundant nutrient source (Conklin-Brittain et al. 1998; Wrangham
et al. 1999). The paleoclimatic conditions associated with changes in the available
plant foods, the series of systematic shifts in life history, and the expected expan-
sion in geographic range are all consistent with this hypothesis about the evolution
of *Homo erectus* (O’Connell et al. 1999).

That taxon is most likely responsible for the rich PlioPleistocene archaeology at
Olduvai and Lake Turkana (Bunn this volume). Larger bodied than Australopith-
ecines, and in larger groups because feeding competition is reduced by reliance on
resources like deeply buried tubers, *erectus* would likely have been more success-
ful in mobbing predators than earlier hominids. Size and numbers would have al-
lowed greater success at competitive scavenging than among previous hominids.
But successes would likely have been way too rare for the meat from large animals to make a difference in day-to-day life. The modern Hadza actively pursue competitive scavenging opportunities. Even using efficient projectile weapons, and absent the daunting competition of the dangerous predator guild of the African Pliopleistocene (van Valkenburgh this volume) they earn little meat this way (O’Connell et al. 1988). The Hadza large-carcass scavenging rate is about two large carcasses per hunter/ year. If much lower rates account for the lower Pleistocene archaeology, then early humans ate more meat from large animals than Australopithecines but not enough to play much role in daily life (O’Connell et al. 1999).

Concluding Remarks

The arguments of this chapter begin with behavior common to both humans and chimpanzees. In both species hunting is largely a specialty of males, and hunters often cannot control the meat they capture. From these similarities I speculate about the social correlates of a transition from hunting small prey to large. Stiner’s assessment (in press) that clear evidence of hunting is late, within the last 2–300,000 years, adds plausibility to the argument that big game hunters do it for the reputation, not the meat. If, as both qualitative and quantitative data on modern people suggest, hunters often have little, if any, control over the large prey they capture, then the nutritional benefits of widely shared resources go largely to others. The hunter’s nutritional income (and so that of their own families) is a small fraction of the large prey they kill.

But hunters get other benefits. The hypothesis favored here is that men with reputations for supplying public meat become desirable neighbors and allies. But there is a catch to building such a reputation. Successes in taking large prey are widely spread in space and time in the modern ethnographic cases discussed here. If that were also true in the past, then reputations for successful large game hunting would require an accumulated record of the experiences of many. The record that arises from telling stories. Hominids without language would never have been drawn to hunting large game. By this argument, the lack of proprietary control makes hunting large prey a poor way to seek nutritional goals but a good way to seek favorable attention among storytellers. That would make meat less important in early human evolution but more important in the evolution of later members of genus Homo.


NOTES

1. It is surprising that the hunter’s household share is bigger for very large prey but not otherwise. Perhaps the successful hunter and his coresidents adjust their claims in anticipation of an influx of hungry visitors. Further work on this question is needed.
2. Circumstances at the agricultural settlement differ. Houses and settlement size create opportunities for privacy that are absent in temporary foraging camps.

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