From a PhD Dissertation entitled: THE BEHAVIORAL ECOLOGY AND ECONOMICS OF VARIATION, RISK, AND DIVERSIFICATION AMONG MIKEA FORAGER-FARMERS OF MADAGASCAR, By Bram T. Tucker. Submitted to the Faculty of the Department of Anthropology, University of North Carolina at Chapel Hill.

Chapter 6
Hunter-Gatherers Who Don't Share?
Non-market Intra-group Food Transfers Examined

A. Introduction

> Of anything [the Arawak] have, if it be asked for, they never say no, but do rather invite the person to accept it, and show as much lovingness as if they would give their hearts.
>
> —Christopher Columbus, quoted in Josephy (1994:115)

> I don't always want other people to see the wild game I have captured. Sometimes I'd rather sell it.
>
> —A Mikea man from Behisatse

One fascinating aspect of Mikea life is that food sharing appears to be quite limited. Public generosity and intragroup transfer of food, particularly meat, is often said to be a universal trait among hunter-gatherers (Sahlins 1972; Lee 1979:117-119; discussed in Kelly 1995:31). The popular image is that of a Kalahari hunter returning at dusk with an eland slung over one shoulder, ready to divide the kill among kin and cronies back at camp. But in the Mikea Forest there are no elands, nor any similarly sized prey, except for the rare wild boar (*Potamocorus larvatus*). A Mikea forager may return from foraging with a bundle of wild guinea fowl or a basket of *tambotrike* (*Echinops telfairi*) weighing a few kilograms at most, but he or she will probably cache this game immediately inside a house, away from the jealous eyes of fellow camp members. A discussion of risk in the Mikea economy ought to address intragroup, non-market food transfers, since sharing may in some cases be a method for reducing risk (Winterhalder 1986, 1990, 1997; Cashdan 1985; Kaplan and Hill 1985; Kaplan, Hill, and Hurtado 1990; Wiessner 1982; Hegmon 1989; Bahuchet 1993; Hames 1990). If the Mikea Forest is a risky place in which to make a living, then why don't Mikea share?

When different foragers in the same community are likely to experience different return rates each day (that is to say, foragers' daily return rates have high variance and low positive covariance among foragers), then intragroup transfer of food can act to "even out" differences in production between foragers (Winterhalder 1986; 1990). If forager X and forager Y both search for eland, and X returns with one animal and Y returns empty handed, X may share his eland with Y's household with the expectation that Y will one day return the favor.

Likewise for farmers: when the threat of crop loss is great, and the risk to each field is largely independent of the risk to the next, then farming communities may reduce risk by sharing surplus production or by pooling and subsequently redistributing all production. Hegmon (1989) simulated early 20th century Hopi agriculture and predicted that for most cases, "restricted sharing," sharing of surplus between a few households, reduced risk of shortfall more consistently than pooling everything or not sharing at all.

In order for sharing to reduce risk there must be some degree of reciprocity. Indeed, the word "sharing" connotes reciprocal exchange. However, gifts given are not always repaid. In a study of food transfers among the Ache of Paraguay, Kaplan, Hill, and Hurtado (1990:124) found that three-quarters of the food consumed was produced by someone outside the consumer's nuclear family, acquired through non-market exchange. However, some men were consistently better hunters and provided more meat each day than they received in turn (Kaplan and Hill 1985; Kaplan, Hill, and Hurtado 1990). Among some Kalahari foragers, good hunters sometimes do not receive any of the meat from their kill, but give it all away (Wiessner 1996). Winterhalder (1997:124) has suggested that the term "food transfer" be used as a neutral term for intragroup exchange behaviors that does not imply reciprocity.

Rather than a rational strategy for risk reduction, food transfer behaviors could occur because the costs of selfishness are prohibitively high. Highly productive foragers may cohabit with unproductive "scroungers" who, rather than spending their time foraging, acquire food through the generosity of the productive foragers (Caraco and Giraldeau 1991; Giraldeau, Hogan, and Clinchy 1990; Vickery et. al. 1991; Giraldeau, Soos, and Beauchamp 1994). Sometimes this generosity is forced. Peterson (1993) has noted that foragers often request that others give to them, and that such requests may be socially costly for the donor to obviate. Peterson has called this "demand sharing." Blurton Jones (1984, 1987) has proposed that productive foragers may tolerate scroungers when food occurs in large packages. As the forager consumes the package he experiences diminishing marginal utility. He may eventually find that the cost of defending it against scrounger is less than the diminished marginal utility of the remainder of the package. Winterhalder (1996) has explored Blurton Jones's "tolerated theft" hypothesis in further mathematical detail. His model predicts that resource packages need only be of medium size relative to other resources for tolerated theft to occur, and that decision-makers would not find it in their interest to donate resources when package size is small.

Others have suggested that unbalanced food transfers may be reciprocated in other, fitness-enhancing ways. Hawkes (1990, 1991), in considering why some Ache males consistently donate meat for which they are never repaid in food, has suggested that productive males publicly display their foraging prowess to achieve status that is ultimately translated into increased mating opportunities and better offspring care. According to this "showoff hypothesis," Ache women compensate showoff men for the meat they have provided by offering them sexual favors. Other men compensate showoffs by tolerating a certain degree of infidelity by their wives with the showoffs. All band members compensate showoff men by granting preferential treatment to the showoff's children. Smith and his colleagues (Smith and Bliege Bird 2000; Bleige Bird, Smith, and Bird 2001) have suggested with the "costly signaling hypothesis" that productive male foragers are not exchanging meat for mates, but rather, are using their foraging prowess as an honest signal of their own worthiness as a mate. Are Mikea males passing up valuable opportunities to increase fitness by not being more generous with their hunting returns?

In this chapter, I explore non-market intragroup food transfers among the Mikea. I begin by presenting three forms of evidence that interhousehold food transfers are quite limited at the Mikea forest camp of Behisatse. First, I present an observation by Kelly and Poyer (personal communication) that the layout of Mikea camps may itself be a strategy to limit food transfers. Second, I discuss anecdotal evidence of food transfer avoidance behavior at Behisatse. Third, I analyze a "consumption event" dataset from Behisatse to gauge the genealogical distance between the consumer of a food product and the producer of that food product. The consumption event analysis demonstrates that for most products, the producer and consumer are closely genealogically related, a pattern of exchange that is more like intrahousehold provisioning rather than interhousehold food transfers. The two exceptions are honey and meat from slaughtered livestock.

By not transferring food between households, Mikea are not reducing risk, nor can they be showing off or signaling. Nor is stinginess a potentially beneficial risk-seeking tactic—the expected energy budget rule (Caraco et. al. 1980) alone cannot explain this behavior. I argue instead that, following Blurton Jones (1984, 1987) and Winterhalder (1996), Mikea don't give away food because food items in the Mikea Forest come in small package sizes and are easily storable, and thus, marginal utility of consuming them remains constant rather than diminishing. Also, it is likely that in some cases, the market value of food exceeds the social value of generosity.

B. Initial observations

1. Evidence of generosity avoidance: camp layout

While the ethnographic literature contains a plentitude of claims of risk minimization through intragroup, interhousehold food transfer (Winterhalder 1986, 1990, 1997; Cashdan

1985; Kaplan and Hill 1985; Kaplan, Hill, and Hurtado 1990; Wiessner 1982; Hegmon 1989; Bahuchet 1993; Hames 1990), there are relatively few documented cases of food transfer-avoidance strategies. Colson (1979) comments briefly on two such cases. First, among the foraging Makah of America's North West Coast, during times of extreme food shortage, boys involved in marine foraging employed techniques for cracking open crab carapaces as quietly as possible, so that others in their community would not know they had food that could potentially be shared. Second, among Gwembe Tonga agropastoralists, during years of insufficient harvest, grain processing activities were conducted inside houses rather than outside, so that other people in the community would not know how much grain the household had—how much grain the household could potentially part with. The common element in both accounts (apart from severe deprivation; I return to this issue below) is that non-sharers value privacy. When resources are publicly visible, they are open to what Peterson (1993) has called demand sharing; other people may ask for them, obliging the owner to be generous.

Kelly and Poyer (personal communication) have observed that the layout of houses in Mikea camps discourages food transfers by limiting visibility of private space. In a Mikea camp such as Behisatse (see Figure 6.1a) all the doors of houses tend to face in the same direction, northward, with the most northerly house often belonging to the oldest male in the camp. With this camp layout it is difficult to see the interior of the houses to the north of you. In contrast, in a Ju/'hoansi camp such as Dobe (see Figure 6.1b; from Tanaka 1980:28), where food transfer is an everyday event, houses are arranged in a ring with the doorways of huts facing inward to a public space at the center of the ring. With this arrangement, all camp members can casually view from public space the contents and events inside each house. The Mikea camp layout restricts the amount of knowledge each resident has about his or her neighbor's production; it enables privacy and food hiding. The Ju/'hoansi camp layout offers very little privacy. Each resident has an equal opportunity to see what every other resident has produced.

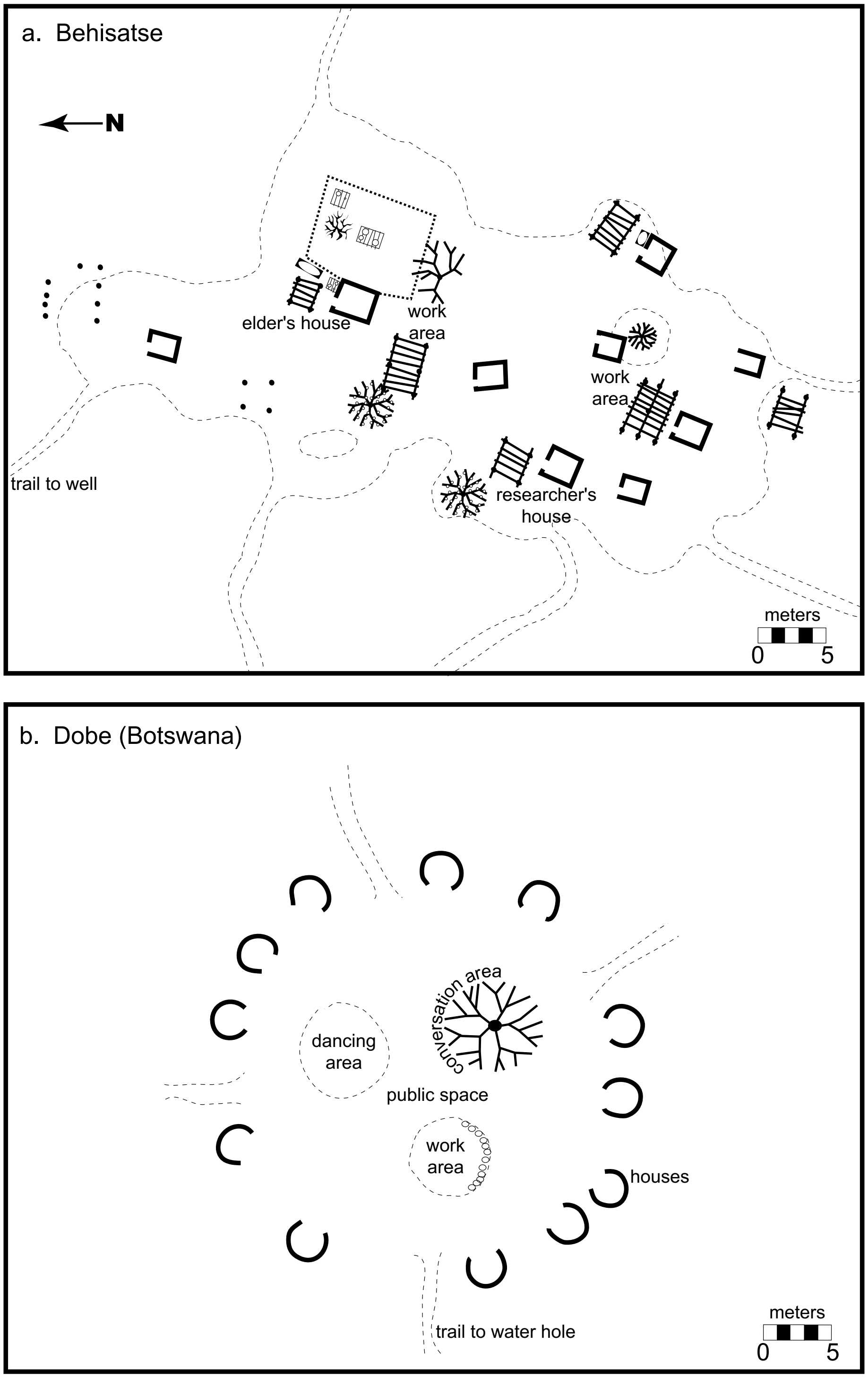

Figure 6.1: Comparison between camp layouts at Behisatse, where sharing is limited, and Dobe (Botswana), where sharing is common. Robert Kelly and Lin Poyer (personal communication) noticed that the layout of Mikea camps (such as Behisatse, top) discourages demand sharing because all doorways face the same direction, limiting casual view of the insides of houses and enabling food caching. In contrast, a Ju/'hoansi camp such as Dobe (bottom) all doorways face each other so that food cannot be hidden, facilitating demand sharing (bottom illustration adapted from Tanaka 1980:28).

Privacy in a Mikea camp is more symbolic than it is effective. I found that even symbolic privacy protected resources from demand sharing. While publicly-visible resources could be demanded, resources that were not in public space but which were visible nonetheless were exempt from demand sharing. The bark-thatched huts at Behisatse were often in considerable disrepair, so that one could see into a house through holes in the walls. Even if someone could spot, through a hole in someone else's wall, a basket of *tambotrike* hanging from a rafter, it would be socially unacceptable for him to demand a *tambotrike* from that household. In actuality, most people at Behisatse were aware of all the resources their fellows had stowed in their houses. Children often transmitted this information throughout camp. Or, as in an example I describe below, people would cook musky-smelling tenrecs or mouse lemurs inside their houses. Other camp members would smell that their neighbors had meat, but they would have felt uncomfortable asking for a part of it.

2. *Mandroso sakafo*! The obligation to give food and how it is avoided

Among Mikea as well as all Malagasy, there is a *social obligation* to transfer food, especially prepared food. When Malagasy sit at a meal, if there are other people in the vicinity who are not eating, the eaters are obliged to call to them, *mandroso sakafo*! Which means, "come eat our food!" The most common response is *misaotse* or *misaotra*, "thank you," a polite way of saying "no." Once in a while, however, the non-eater takes up a spoon and the eaters are obliged to be true to their offer, although they may secretly consider the guest eater to be somewhat impolite.

The food transfer situation was a little different when it came to visitors (*vahiny*). Wherever I went in Madagascar I witnessed that Malagasy people in general prided themselves on the great care they took hosting visitors. Food was always prepared for visitors and shared with them. Often hosts would prepare special meals for their visiting guests; if it was within their power, they would serve chicken and rice rather than maize porridge. For hosts, it is considered to be rude not to feed visitors. For visitors, it is considered rude not to accept. This was as true among Mikea as it was among other Malagasy.

Nonetheless, I observed that Behisatse residents went to great lengths to avoid the social obligation to be generous. This is well illustrated by the following anecdote. The members of one of the households at Behisatse in November were widely reputed throughout the forest to be lousy farmers and excellent foragers. They were at Behisatse to plant a *hatsake,* but they spent the majority of each day on long foraging trips. They would usually return to camp at night and from strange directions (not along paths) so that it was very difficult for others in camp to notice their return. They cached their game within their house before entering into the public space of the camp. At the time I first noticed this behavior, I was just starting my foraging log, a diary of what Behisatse residents were catching each day. When I asked the kids from this household what they had caught they usually answered that they had caught nothing. A few minutes later I would invariably notice a small cooking fire within their house accompanied by the smell of cooking meat. Meanwhile, a separate cooking fire, outside their house, was boiling a pot full of wild tubers. When mealtime arrived the household would sit around the bright campfire, outside in public space, eating the boiled tubers, and they would call to us, *mandroso sakafo*! With the tubers consumed they would then extinguish the fire, and, hidden by darkness, they would enter the house. There they would add to the smell of cooking meat the sounds of chewing, smacking lips, and contentment.

On one occasion in particular, a boy from this household had told me that they had captured nothing that day; later on in the evening, I happened to spy a roasting *tandrake* (*Tenrec ecuadatus*) in their house, and I pointed out, jokingly, that I had caught him in a lie. Fifteen minutes later, he offered me half a roasted *tandrake*![1] He had interpreted my curiosity about his *tandrake* as demand-sharing (Peterson 1993).

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[1] Accepting or not accepting an offer to share is a delicate issue. Foragers frequently gave us wild tubers, or, on the coast, fish and crabs. We learned to accept gifts and then to reciprocate after a delay with coffee, sugar, beans, rice, fruit, American peanut butter, tobacco, or cash.

An interesting aspect of this anecdote is that tubers and wild game were treated in very different ways. The household offered to share tubers with us, albeit with the knowledge that accepting their offer of *mandroso sakafo* would be somewhat socially deviant. They did not offer to share meat with us, except when they felt that I had shamed them into it.

C. Consumption event log

1. Methodology

My casual observations at Behisatse in Novemeber 1997 encouraged me to record the frequencies of food transfer behaviors in a quantitative fashion, so as to demonstrate empirically the extent to which nonmarket food exchange occurred in this community. The methodology I adopted is similar to that used by Kaplan, Hill, and their associates in their study of Ache food transfer (Kaplan et. al. 1984; Kaplan and Hill 1985). Staring in January 1998, my research team and I observed all "consumption events," meals and snacks, that occurred at the Behisatse camp. For each event, we recorded (1) the date and time, (2) the product being consumed, (3) the names of the consumers, (4) the name of the producer, (5) the name of the preparer, (6) where it was prepared (inside or outside), and (7) where it was consumed (inside or outside).

My objective was to compare and contrast the frequency with which people consumed products that were produced by members of their own household—one might call this "household provisioning"—versus the frequency with which they consumed food that was produced by others outside their household and acquired through food transfer. In order to do this, I had to first decide who was in each household and who was not. Given that all 30 Behisatse residents in January and March 1998 were genealogically related (Figure 6.2), this suggested that there may in fact be a continuum of exchange behavior with intrahousehold provisioning and interhousehold food transfer as extremes.

My working definition of a household was a coresidential familial unit that produces and consumes together (Bender 1967; Wilk and Rathje 1982:618). There may be a correlated concept in Malagasy—the word *traño* refers to both a house and the people who live within it. I risked forming an obvious tautological argument if I defined households as "people who consume together" and then conducted an analysis of whether or not people within a household consume together. Instead, I delineated households by other criteria: (1) people who habitually tend the same fields with no payment of wages; (2) people who live in the same house or house complex (see Figure 6.2); (3) people who relocate together, or who strategize their mobility in unison to pursue common goals. In practice, defining households was rather unambiguous. In large part, the households I defined were nuclear families. The two exceptions included a case of fosterage of a girl by her grandmother, and of an unmarried teenaged boy who cooperated with his older brother's household rather than that of his parents.

Figure 6.2 illustrates that the six households cluster into two groups based on genealogical distance. Households 1, 2, and 3 include the household of the elder male and female, and the households of two of their sons. The heads of these households are related to each other by a parent-offspring or sibling relationship. On the other side of the family tree, households 4 and 5 are headed by first cousins, and both are nephews of the male head of household 6. I refer to these two groups of households as "genealogical clusters." Interestingly, these genealogical clusters are reflected in the layout of the Behisatse camp (Figure 6.3), where physical distance between houses almost mirrors genealogical distance between residents. This suggests that the division of households into genealogical clusters is more than just the researcher's etic invention, but rather, reflects an emic social division.

As stated above, intrahousehold provisioning and interhousehold food transfer may be endpoints on a continuum of exchange behavior. I distinguish between four levels in this continuum:

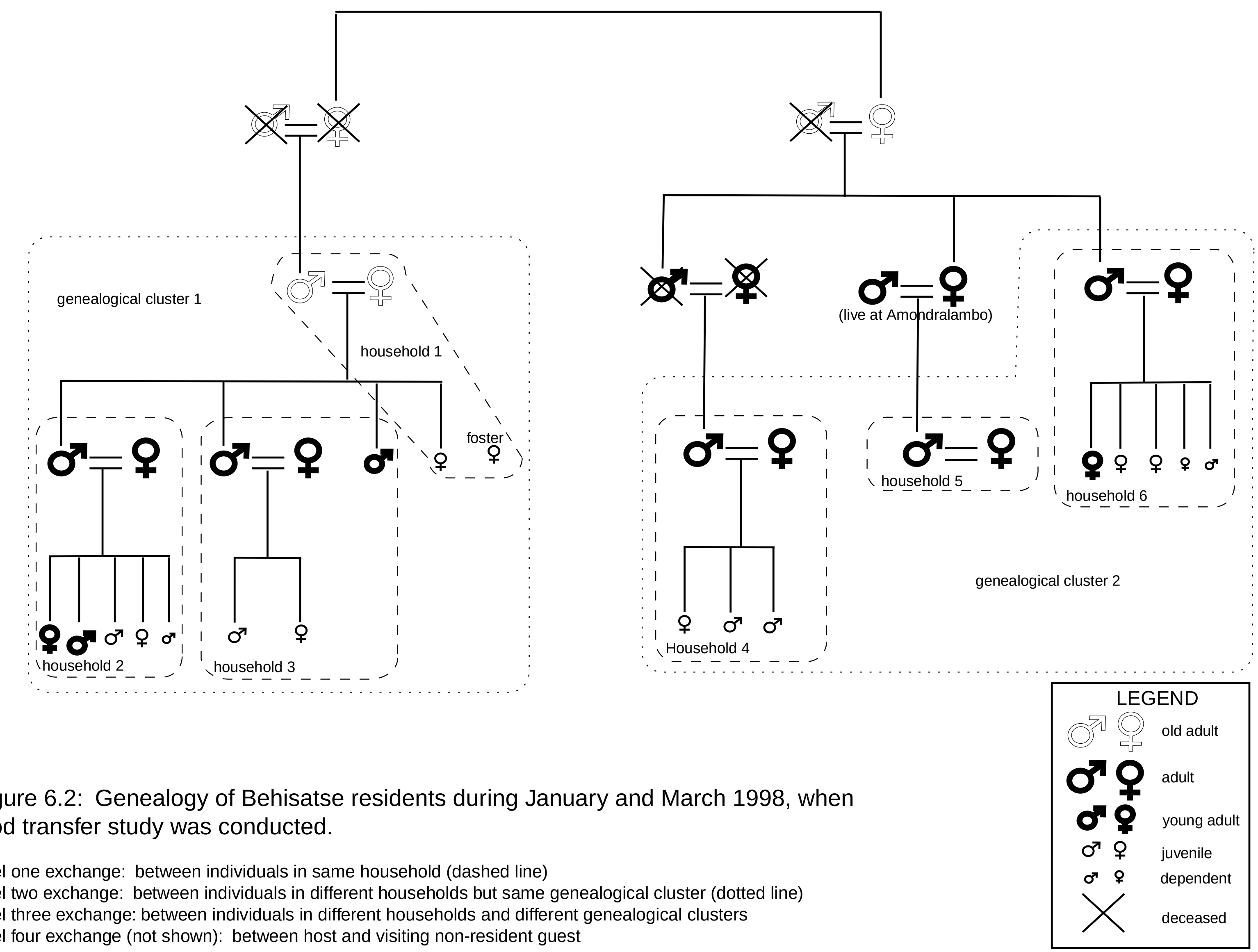

Figure 6.2: Genealogy of Behisatse residents during January and March 1998, when food transfer study was conducted.

level one exchange: between individuals in same household (dashed line)
level two exchange: between individuals in different households but same genealogical cluster (dotted line)
level three exchange: between individuals in different households and different genealogical clusters
level four exchange (not shown): between host and visiting non-resident guest

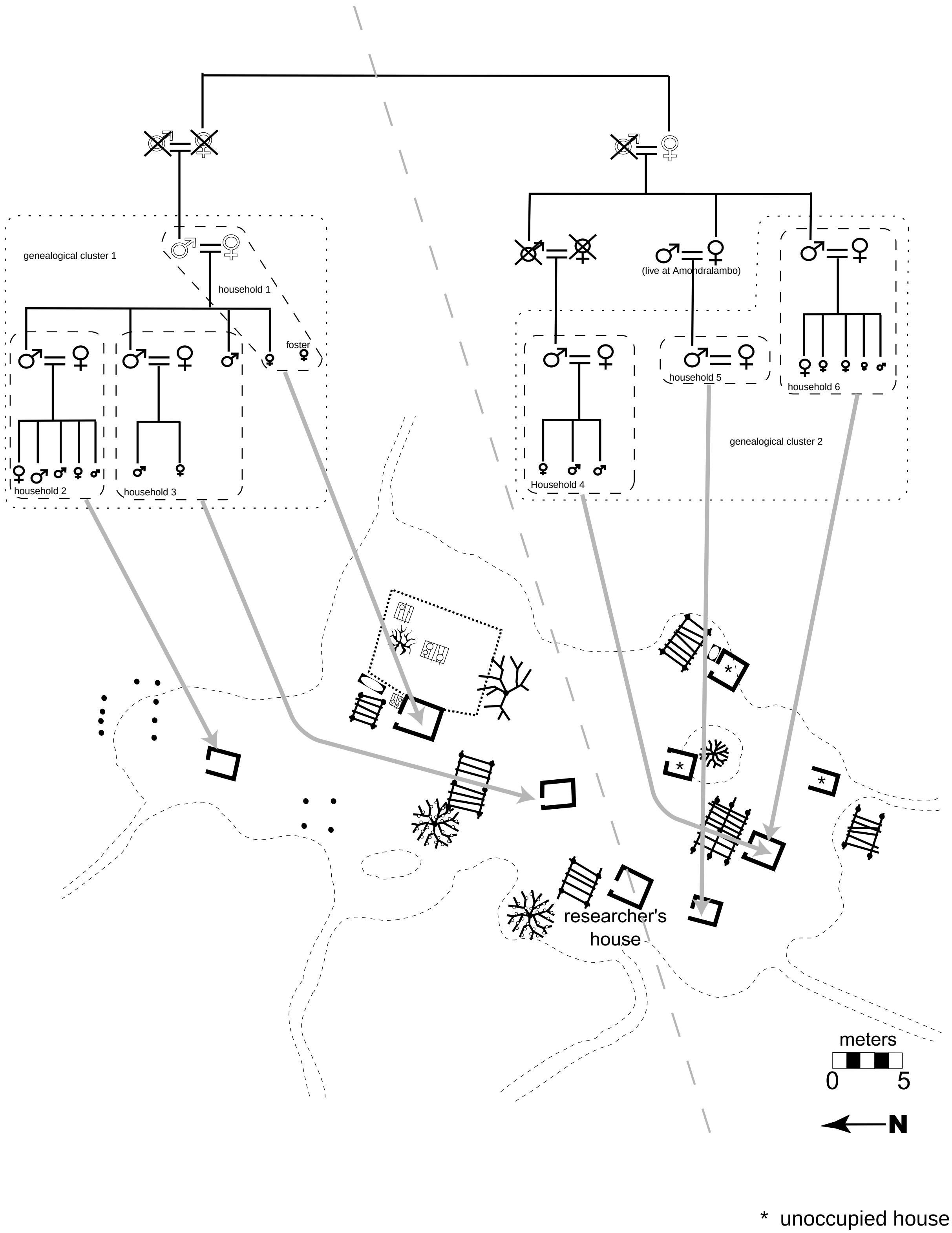

Figure 6.3: Genealogical distance and spatial distance within the Behisatse camp

- Level one: Exchange between individuals in same household. This is household provisioning in its truest form; mom boils a pot of maize porridge and feeds it to her children. Dad kills a few *tambotrike* and gives them to his children.
- Level two: Exchange between individuals in different households but the same genealogical cluster. Dad captures a feral cat and some wild tubers, which he cooks. His brother has not returned from foraging yet, so he feeds his brother's children as well as his own.
- Level three: Exchange between individuals in different households and different genealogical clusters. This is the most extreme level of interhousehold food transfer possible in the Behisatse data, given the residents' degree of relatedness. A woman in household 1 gives a basket full of dried manioc to the people in household 6.
- Level four: Exchange between a host household and a visiting non-resident guest, where the guest is genealogically distant from the host.

I began our consumption event log in January 1998, and continued it during all seven subsequent months that I collected observational data at Behisatse. The resulting data set included 257 consumption events. However, not all these data points are useful for examining the frequency of interhousehold food transfers. This is because the camp fissioned in April 1998—after near complete crop loss due to drought and grasshoppers followed by witchcraft accusations, genealogical cluster 2 relocated to Namonte. Therefore, after April, no level three exchanges were possible. So the analysis presented here is based on limited data, those consumption events observed during January and March 1998 (n=83), before the camp fissioned.

2. Results and discussion

As illustrated by Figure 6.2, the number of people in both genealogical clusters is roughly equal (n = 16, n = 14), as is the number of adults and old adults (n=6, n=6).

Table 6.1: Results from consumption event log with regard to genealogical distance between food producer and food consumer.

Product	N	Level 1 within household (HH provisioning)	Level 2 within genealogical cluster	Level 3 between genealogical cluster	Level 4 feeding visitors
Manioc	17	61 %	28 %	2 %	9 %
Maize	10	56 %	27 %	0 %	17 %
Wild tubers (*ovy*)	22	69 %	24 %	2 %	5 %
Cucurbits	19	80 %	19 %	0 %	1 %
Honey	8	62 %	5 %	17 %	16 %
Wild game meat	5	72 %	8 %	0 %	20 %
Domestic meat	2	11 %	36 %	29 %	24 %
TOTAL	83				

Therefore, if interhousehold food transfer behavior is ubiquitous, consumers would be equally likely to eat food produced by people within their genealogical cluster as they would to eat food produced by members of the other genealogical cluster. Consumption events should be more or less evenly divided between a combination of level 1 and level 2 exchanges versus level 3 exchanges. If, on the other hand, food transfer is limited and foragers are merely provisioning their own households, consumption events should be skewed in frequency so that level 1 exchanges predominate. Figure 6.4 and Table 6.1 summarizes the percent of consumption events that occurred at each exchange level for each product.

The overall pattern for most products is consistent with intrahousehold provisioning rather than interhousehold food transfer. For all products except for domestic meat (slaughtered livestock), the vast majority of meals were occasions when the consumer and producer were members of the same household. Level 3 exchanges were very rare for all products except honey and livestock.

For the four major starchy staples—manioc, maize, wild tubers, and wild cucurbits—in 56 to 80 percent of meals, consumers and producers are in the same household, while in 19 to 28 percent of meals, consumers and producers are in different households but the same genealogical cluster. Starchy staples, the basis of nearly every meal, were usually consumed in the household but were sometimes distributed among close kin across household borders.

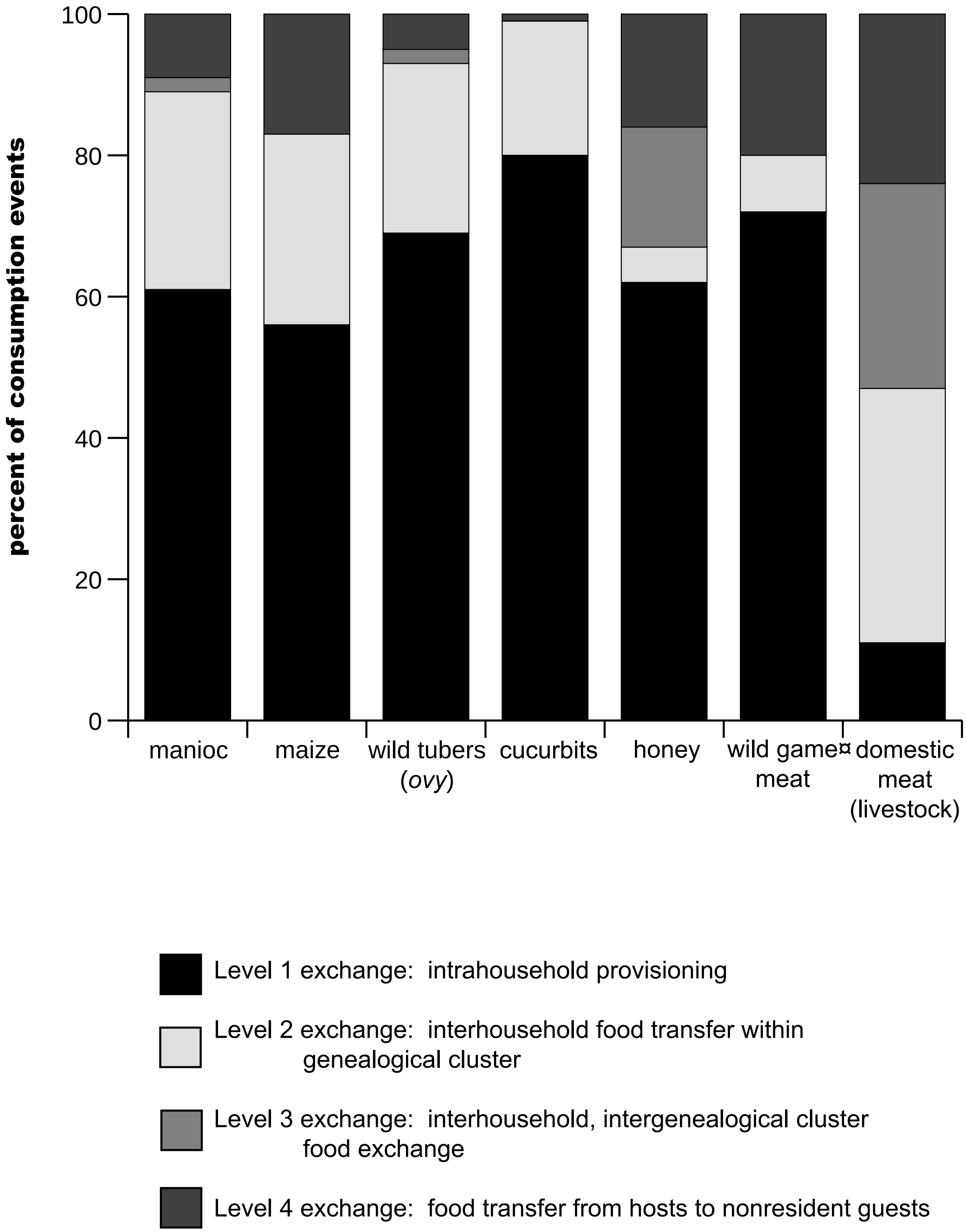

Figure 6.4: Frequency of food transfers at Behisatse, January and March 1998, from consumption log data (see Table 6.1).

I often observed that households within the same genealogical cluster would pool food preparation tasks, and thus foodstuffs. These foodstuffs required a long cooking time—the designated cook on a given day usually could not afford to forage on the same day. By pooling food preparation tasks, more people could spend the day foraging. This behavior is a type of interhousehold food transfer, albeit a limited one, and it might function to reduce risk to a limited extent.

However, note that the comparison between level 1 and level 2 exchanges is unbalanced. For any individual at Behisatse, there were more potential donors at level 2 than there were at level 1. If producers were provisioning everyone in their genealogical cluster regardless of which household they were in, we would expect there to be more level 2 exchanges than level 1 exchanges. That this is far from the cases strongly suggests that the most significant pattern is one of household provisioning rather than interhousehold transfers at any level.

Maize and cucurbits were never shared across genealogical cluster lines (at level 3). In only three cases were manioc or wild tubers shared at this level. In all three cases, a single child from the cluster opposite to the producer's sat to a bowl of prepared food with his playmates, who were themselves of the same cluster as the producer. This may be an example of demand sharing (Peterson 1993). The value of the food eaten by the offending child may have been less than the social costs to the parents of chasing the kid away. The provisioning parent probably offered *mandroso sakafo*, but the offending kid did not yet understand that the culturally acceptable adult response to this invitation is to decline. Note, however, that this kind of food transfer could act to reduce risk. The offending child has scored a free meal, thus reducing his own household's consumption requirements. It is possible that parents depend on the fact that adults in the other genealogical cluster have limited power to shoo away their hungry children to increase the probability that their children will eat each day.

Table 6.1 demonstrates that wild game meat was almost never exchanged beyond the household, although it was fed to visitors. Unfortunately, the sample size was quite small—we only observed five consumption events involving wild meat during January and March. This is largely due to a methodological difficulty: because foragers often concealed the presence, preparation, and consumption of wild meat, we the researchers rarely succeeded in observing wild meat consumption events. That this was even a problem for us enforces the conclusion that wild meat remained within the household of the producer, and was not widely distributed.

One of our five observations of wild meat consumption was only possible because the meat was served to visitors in public space. Serving meat to visitors is consistent with the cultural value placed on hospitality. However, it is unlikely that 20 percent of all wild game was given to visitors, as the limited data in Table 6.1 suggests. Meat distribution in public space with visitors was simply more observable by the data collectors than was selfish meat consumption in private space.

For honey and domestic meat, a considerable percent of consumption events corresponded to level three exchanges.

Honey is arguably the most prized of all forest foods. Foragers usually attempted to hide any honey they found, but the information that someone had brought honey into camp was disseminated with great rapidity, often by children. Once the information was public, people approached the successful forager with spoon in hand. We heard several accusations of honey theft, although I cannot recall ever having heard about theft of other foods.

I only observed two events during which slaughtered livestock were consumed during the months of January and March. Both of these corresponded to a *soro* ceremony, in which a cow was slaughtered as part of a ritual to invoke ancestor spirits. The event was sponsored by the old man in genealogical cluster 1, but all camp residents attended regardless of genealogical relationship. Males from both genealogical clusters cooperated in the slaughter and meat division. There are certain ritually-prescribed rules as to how the meat should be distributed, but the number one rule is that everyone gets a share.

Meat transfer seems to be the rule when livestock are slaughtered for utilitarian reasons as well. I was present for many goat slaughters in non-ritual contexts, and in each case, every household (including ours) received a share of the meat.

Domestic meat seems to be only product that was shared unconditionally. This is not to say that domestic meat was always shared *willingly*, as the following anecdote demonstrates. On my very last day at Behisatse in July 1999 we slaughtered a goat that I had purchased. The goat was slaughtered at dawn. Starting at about 9:00 am, the camp filled with various visitors. Each visitor casually offered a different excuse for visiting Behisatse on that day, including a trip to the well, foraging, or social obligations. All of the guests knew that it was my last day in camp—and all of them knew that I had slaughtered and distributed a goat and a large turkey before my departure in October 1998. Several camp residents privately complained to us about the visitors, stating that they had only visited so as to demand-share meat. Sensing a difficult political issue, we left the task of dividing and cooking the goat up to the man in household 3. He hid the goat carcass on top of his ramada—it was clearly visible to everyone, yet it was clearly outside of public space. The rest of the day was spent strategically waiting. The residents waited for the guests to leave so that they could eat the goat with some maize porridge, without having to give any meat away. The guests waited for the residents to start cooking, so they might be invited to eat. This standoff continued until dusk when finally the guests conceded defeat. Their flimsy excuses for having visited in the first place becoming increasingly incredulous, they finally departed in unison. Meanwhile, the Behisatse residents had eaten nothing the entire day, nor had they even started pounding the maize that takes several hours to boil into a meal. Neither had they done any real work all day, for they did not want to leave camp lest the guests depart and the feast begin while they were gone. Maize pounding began at about 20:00. Undoubtedly, the departing visitors could hear the pestles reporting in the distance, and they must have realized that preparations for the feast they had so hoped to crash would now, finally, begin. We ate the goat around midnight. In this case, it may have been that the reward from this small goat was small enough that the cost of supporting free-riding scroungers was considered prohibitive.

The consumption event data demonstrates that interhousehold and intergenealogical cluster food transfer was extremely limited among the Mikea at Behisatse. Only slaughtered livestock was divided and distributed openly and publicly. Other types of food transfer occurred rarely and with limited effect. Closely related households sometimes pooled their main carbohydrate source, perhaps as an effort to reduce food preparation labor. Children occasionally demand-shared from the parents of their playmates. Many people demand-shared honey. Any of these exchange behaviors could help reduce variance in food intake in certain, limited circumstances, but none of them offer a dependable method for ensuring constant daily food supply.

D. Why don't Mikea share?

1. Expected energy budget rule

Why is food transfer so limited among Mikea, while risk is a major concern?

In the example of Hopi agriculture discussed in the introduction, Hegmon (1989) concluded that sharing was an inefficient strategy when household subsistence requirements were high and starvation was a real threat. Likewise, in the Makah and Gwembe Tonga examples mentioned above (Colson 1979), generosity was curtailed in times of food shortage. Behavioral biologists have discovered a similar trend in the behavior of animals under experimental conditions (Barkan 1990; Barnard and Brown 1985; Caraco 1981, 1982, 1983; Caraco, Martindale, and Whittam 1980; Cartar 1991; Cartar and Dill 1990; Ekman and Hake 1988; Gillespie and Caraco 1987; Hamm and Shuttleworth 1987; Tuttle et. al. 1990; Young et. al. 1990). When birds were offered a choice between a predictable medium-sized quantity of food or an unpredictable quantity that was equally probable to be high or low, the birds' decisions depended upon their energy levels. When birds were close to starvation, they chose the variable option. When birds were merely hungry, they chose the constant quantity.

The observation that organisms will be risk seeking when the threat of starvation is real and risk-averse when starvation is unlikely is called the expected energy budget rule (Caraco, Martindale, and Whittam 1980). The underlying assumption is that the utility gained by organisms is essentially sigmoidal in shape (Caraco, Martindale, and Whittam 1980; Friedman and Savage 1948; Kohler and Van West 1996; Winterhalder, Lu, and Tucker 1999). Figure 6.5a illustrates this utility function. The parameter R_{min} defines the minimum quantity that must be consumed to avoid starvation. For every unit of a resource consumed less than R_{min}, the consumer gains an increasing amount of utility (increasing marginal utility). Once R_{min} has been satisfied and starvation is no longer a menace, each additional unit that is consumed yields diminishing marginal utility. For an organism threatened with not achieving R_{min}, the potential loss of utility from a risky activity is less than the potential utility gain. A gamble is worth while.

In the Mikea case, failing to reciprocally exchange food is a gamble. The selfish household may benefit greatly by hoarding its periodic bonanzas, but it gains no benefit on all the other days when neighbors refuse to share from their bonanzas. If Mikea foragers are chronically stuck on the left-hand side of figure 6.5a—if they regularly face the threat of food insufficiency and starvation—then transfer-avoidance could be a well-calculated gamble, consistent with the predictions of the expected energy budget rule (Kohler and Van West 1996). To evaluate this explanation, we must consider the consistency with which Mikea foragers manage to meet their food requirements.

The Mikea do not live in a Rousseauian fantasy—food shortage and starvation do occur. At times when households face these threats, their utility functions for food resources are characterized by the accelerating marginal utility of risk takers. However, these threats do not appear to be chronic, at least with regards to energy. None of the six households discussed in this chapter were threatened by imminent energy shortage during January and

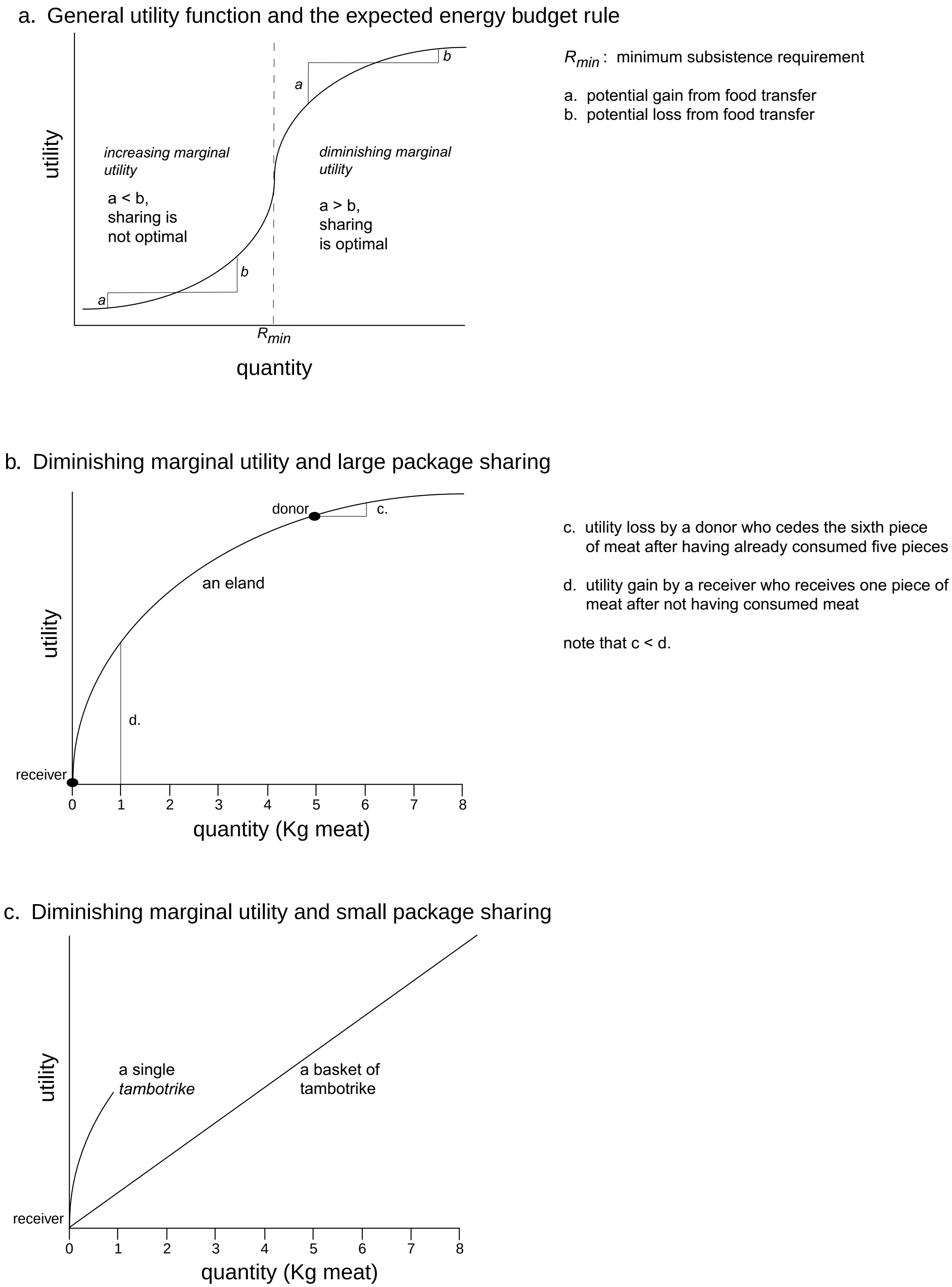

Figure 6.5: Utility and nonmarket exchange.

March, when the consumption data discussed above were collected. Five of the six households had stores of dried manioc or maize in January. When these stores ran dry, Behisatse folks gathered wild watermelons which they cooked into a dense porridge. The wild watermelons were extremely plentiful; during the wet season, every manmade clearing in the forest is carpeted with cucurbit vines. By March, wild tubers became available, and as much as 4400 net kcals could be harvested per hour (mean = 2100 kcals/hr; see Chapters 4 and 7). Average tuber foraging efficiency for all age/sex groups during all seasons was 1700 kcals/hr. Energy was too easily obtained in the Mikea case for the expected energy budget rule to explain the Behisatse residents' stinginess with regards to starchy staples.

It is possible, however, that Mikea face chronic shortages of fat and protein. These macronutrients are rare in the Mikea diet. Sometimes people would purchase beans to mix with their various starchy porridges, but this was a rare use for cash at Behisatse, where cash was valued foremost as a vehicle for obtaining tobacco (see Chapter 8). Most of the protein and fat they consumed came from wild meat or domestic meat. Wild game was not captured every day, and wild game animals in the Mikea Forest were very small. It is possible that people did not share wild game because the protein and fat value were simply too valuable to part with. Inconsistent with this conclusion, however, is the fact that Behisatse was home to about 150 goats and 20 cattle. If meat was in such short supply, why didn't Behisatse folks slaughter more livestock? The expected energy budget rule may play some role in explaining why Mikea foragers went to such extreme lengths to conceal game, but this explanation invokes some ambiguity.

2. Marginal value and package size

I have argued above that the threat of starvation is not constant. More frequently, therefore, Mikea experience diminishing marginal utility from consuming their food resources. Blurton Jones's tolerated theft hypothesis (Blurton Jones 1984; 1987; Winterhalder 1996) explains food transfer from the perspective of diminishing marginal utility. The model compares the marginal value of the quantity donated to the marginal value of quantity received. To illustrate, recall the classic image of the Kalahari hunter with an eland slung over one shoulder—he returns to camp, and his household prepares and consumes the meat (Figure 6.5b). Assume that the meat cannot be easily preserved, so that if the animal is not consumed within the day it will start to rot. The hunter's household has certain subsistence requirements. Once the requirements are met, each additional piece of meat consumed offers increasingly less utility than did the piece before it. As the household consumes, the quantity of meat remaining is increasingly devalued. If the hunter shares meat with another household that has no meat, the donor (the hunter) is only losing the diminished utility of that additional piece of meat. The receiver gains considerably more utility for the same quantity of meat, for the receiver had not yet eaten any. The loss to the donor is less than the gain to the receiver. The receiver, however, owes a debt to the donor equal to the utility received. When the receiver reciprocates, the donor gains more utility than was lost.

Blurton Jones (1984; 1987) asserts that package size would have to be large, like an eland, in order for "theft" (donation to a scrounger) to be tolerated. However, Winterhalder's (1996) marginal value model demonstrates that the package need only be of intermediate size; "A tolerated theft package must be large enough to be attractive to supplicants but small enough that the last portion transferred does not sate all present" (1996:48). Winterhalder further points out that small packages ought not be donated. Giving away a small food package would constitute an intolerably large loss to the donor, and an intolerably small gain to the receiver.

Package size, the weight of one captured plant or animal, was a very important determinant of the degree of food distribution among Ache foragers. Large packages were frequently transferred while small ones were transferred with less frequency (Kaplan, Hill, and Hurtado 1990:122). Among Mikea, food sources almost always occur in small packages. This is particularly true with wild meat. *Tambotrike*, mouse lemurs, and birds only weigh a few hundred grams; *tandrake* and feral cats rarely weigh more than one kilogram. With packages this small, utility is never likely to diminish far enough for food transfer to be worth while.

Consider a forager who catches a single *tambotrike*. Package size for this tenrec is very small, each animal weighing only 200 to 250 grams. As graphed in Figure 6.5c, by the time the forager begins to experience diminishing marginal utility, the tenrec has already been eaten. A single *tambotrike* cannot be divided among camp members without an unacceptably large loss to the producer, and an unacceptably miniscule gain to the receiver.

Consider a forager who produces a basket of *tambotrike*. One could consider the *basket* to be the package rather than the individual animal. In this case, package size is large, and the forager could potentially give away a few animals to other households. However, *tambotrike* preserve extremely well. They hibernate for much of the year. Foragers can store *tambotrike* alive in torpor, and then kill one or two as needed for food. Foragers experience diminishing marginal utility when eating *tambotrike*, but they always have the option to put the tenrecs away for a while and eat them later. There is no cost to delaying consumption of the basket of *tambotrike,* as there would be for not consuming a rotting eland carcass. When the forager consumes the tenrecs the next day, he experiences the same level of utility as he did for consuming the previous units. The marginal utility of *tambotrike* remains more or less constant—it never diminishes far enough that they are worth donating.

Tenrecs are unique among game animals in the ease with which they may be preserved alive. These are also the most plentiful of wild game animals. Foragers at Behisatse could return from a three day excursion with 50 to 150 *tambotrike*. The largest number of *tandrake* I ever saw a forager capture was six. The other game animals were mostly solitary. Rarely did foragers produce more than a few mouse lemurs or feral cats at a time. A successful cat hunter is unlikely to divide the small carcass among different households, giving a paw to one and a tail to the next.

Domestic meat and honey were shared more frequently than any other resources at Behisatse. Note that these foods occur in medium to large package sizes. Honey is found in quantities of 5 to 10 kilograms while a typical serving is only a few dozen grams. Losing a kilo to demand-sharers may not be a big deal (but see market considerations, below). Butchered livestock is similar to the dead eland with regards to marginal utility—a big bonanza that will go bad if it is not expeditiously eaten. That these resources and no others were shared at Behisatse is consistent with Winterhalder's marginal utility predictions.

Honey is perhaps somewhat more difficult to explain. While package size is medium, honey is also quite storable. Honey may be more like a basket of *tambotrike* than it is like a goat (or an eland), in which case it ought to be selfishly hoarded. Perhaps, given the centrality of honey in the cultural scheme of food value, honey is considered to be some kind of common property resource that no one has the right to hoard. Not giving honey to demand sharers may be considered to be immoral. I suspect there may be some truth to this, but this sentiment is definitely in conflict with the high market value for honey. Note that some of these level 3 consumption events involved children. Denying children their favorite snack may be particularly socially unacceptable. It is also possible that the data I have on honey consumption are not representative of the larger pattern.

Presumably, if some large game were to wander into the Mikea scenario, people would share it. Consistent with this prediction, I witnessed that net fishers on the coast were frequently very generous with their piscatorial bonanzas, giving away as much as half of their take each day. Wild boar would be a test case. Wild boar, the only large game in the Mikea Forest, are quite rare—during 19 months of forest residence I never saw one alive, and only once did I enjoy boar meat. The tolerated theft explanation predicts that Mikea foragers ought to readily share wild boar. This remains to be tested.

The tolerated theft perspective explains why the wild game available to the Mikea is not widely exchanged, and why domestic meat and honey are widely exchanged. In terms of vegetal resources, maize and manioc may not be transferred because they, like *tambotrike,* are highly preservable. Over a certain period of time, a household can gain near constant utility from a store of agricultural foodstuffs. Wild tubers and cucurbits are rarely stored.

These, however, are plentiful and dependable. Cucurbits were consumed at the household level more frequently than any other food. This is probably because it was almost as easy for a forager to pick melons herself from the ground as to demand-share them from a neighbor. Wild tubers were more costly to acquire. However, foragers rarely returned from a tuber-digging trip empty handed. Low variance in tuber foraging efficiency and high covariance between foragers means that food transfers are not needed, and would not effectively reduce risk (Winterhalder 1986).

3. Market exchange

A third possibility is suggested by the epigraph at the front of this paper—foragers may avoid food transfers because they may obtain more utility by exchanging their products in the market than by exchanging the products with their fellows. In the market, reciprocity is guaranteed, and at an explicit rate. This explanation is more plausible for some products than others. There is no market for mouse lemurs, feral cats, and wild cucurbits—forest dwelling Mikea are derided by their neighbors for eating such foods. However, sale of honey and tenrecs provided the majority of the cash earned by the Behisatse households in 1998. Cash was used to obtain nonfood goods such as tobacco, clothing, soap, and batteries for the cassette player—commodities that are not available through nonmarket exchange with campmates (see Chapter 8). This hypothesis could be tested by examining whether nonmarket exchange behavior is different in camps with more or less access to markets.

E. Conclusions and implications for evolutionary ecology

The Mikea differ from the majority of the world's foraging peoples in that they practice very little intragroup, interhousehold food exchange; public generosity of the type reported for other foragers (Kaplan et. al. 1984; Kaplan and Hill 1985; Kaplan, Hill, and Hurtado 1990) is absent here. For most resources, food is consumed by members of the producer's household. In common with other hunter-gatherer societies, the obligation to share is ever present. In practice, however, Mikea foragers often spend considerable effort avoiding exchange obligations. This is especially true for wild game, which Mikea foragers try to hide from their fellows as much as possible.

The generosity-avoidance behaviors I observed at Behisatse are incompatible with Hawkes's showoff hypothesis or Smith's et. al.'s costly signaling hypothesis. Bleige Bird, Smith, and Bird (2001) state that in order for costly signaling to function, signals must be unambiguously transmitted and received. The Mikea do everything in their power to restrict transmission of information regarding their foraging ability. Mikea men cannot possibly be using their foraging prowess to advance fitness objectives in these ways.

There is a dearth of fat and protein in the diet of Mikea in forest camps, so it follows logically that men could create fitness-enhancing debts if they managed to share meat. However, package size for wild meat is so small that this is not an option. It is possible that the distribution of slaughtered livestock meat could be a method for showing off. Livestock is wealth and prestige in Mikea society. But here again, men are modest—downright secretive—about the size and composition of their herds. There are definite costs to immodesty in this society, including witchcraft accusations.

A cursory glance at Figure 6.2 reveals another reason that the showoff hypothesis and costly signaling hypothesis may be invalid, at least at Behisatse—there are few available women for the males to show off to, or to whom to send signals. All of the unmarried young women are the males' own close kin; mating with them would violate incest taboos. The married women are the brides of men's brothers, cousins, or nephews. Infidelity with a sibling's spouse could carry a high social cost. Infidelity is common among Mikea and their neighbors, but it usually occurs between visitors and residents rather than among residents at a small camp such as Behisatse.

The results of the consumption event log suggest that there is a continuum of exchange behavior between intrahousehold provisioning and interhousehold food transfer. For Mikea, degree of food distribution appears to decrease with increasing genealogical distance. At first glance this appears to be consistent with kin selection (Hamilton 1963, 1964; Kaplan and Hill 1985:224). However, an alternative explanation is that this distribution pattern is a result of propinquity—Mikea foragers may transfer food more often to those who live closest to them. It may be the case that Mikea foragers always try to limit their food transfer obligations by hiding the food they have produced as well as possible. Those who live near them are more likely to notice the presence of sharable food and demand-share a portion, than are those people who live on the other side of camp. At Behisatse, physical distance between houses mirrors genealogical distance so that propinquity and kin selection are impossible to distinguish. This difference might be detectable in Mikea communities that are more genealogically and spatially diverse.

The Mikea case demonstrates that there is variation in nonmarket exchange behavior among foragers, and I have argued here that this variation is best explained Winterhalder's (1996) marginal utility model. Variation in nonmarket exchange behavior may have existed among prehistoric foragers as well. Hunter-gatherers who lived in environments without large game may not have practiced public generosity. The showoff hypothesis would be inapplicable in these circumstances.