

**A FRUGAL (RE)PAST:
USE OF ORAL TRADITION TO BUFFER FORAGING RISK**

Michelle Scalise Sugiyama

and

Lawrence S. Sugiyama

**Anthropology Department and
Institute of Cognitive and Decision Sciences
University of Oregon, Eugene 97403**

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Abstract: Successful exploitation of the foraging niche requires extensive, specialized knowledge, much of which is acquired through social learning. Research suggests that the oral tradition is a social learning mechanism, used to exchange information critical to solving recurrent problems of forager existence, such as manipulating and being manipulated by others, subsistence, predator avoidance, free riding, and wayfinding. This paper examines forager folklore in relation to the problem of foraging risk. Anthropologists have documented numerous cultural strategies that appear to mitigate the problem of resource variance; however, we know of only one study that documents the use of folklore to buffer this problem, and that study is limited to one culture. In this paper, we present evidence that, cross-culturally, forger folklore contains three kinds of information relevant to buffering day-to-day and catastrophic foraging risk: information that (1) calls attention to the problem of foraging risk and the cues associated with it; (2) condemns behaviors that exacerbate this problem (e.g., stinginess, greediness, laziness); and (3) models behaviors that mitigate it (e.g., sharing, generosity, industriousness).

I. What Folklore Can Tell Us About the Past

In 1875, Rink proposed that where indigenous material culture had been largely supplanted by Western goods, a glimpse of pre-contact life might be had through oral traditions. Two lines of thought issue from this proposition. One sees oral tradition as a window onto past conditions, events, or practices of a local nature. For example, in support of archaeological evidence that their ancestors arrived in the Dobe area over a thousand years ago, Lee argues that the “Dobe !Kung . . . have no tradition of being refugees from other areas” (*Dobe !Kung* 17; see also Boas, *Kwakiutl Culture*; Goodwin 1939:x; LeBlanc & Register 65; Opler, *Lipan* 6; Schaafsma 90). The second line of thought sees folklore as a window onto past conditions of a pan-human nature. Biesele, for example, observes that Ju/'hoansi folktales “deal with problem points in living which must always have characterised the hunting-gathering adaptation, such as uncontrollable weather, difficulty in procuring game, danger from carnivore attacks, and correct relations with in-laws” (*Women* 13; see also Fock 17). Similarly, Daly and Wilson suggest that recurrent folklore themes may be “a reflection of certain basic, recurring tensions in human society” (85). These observations imply that oral traditions can be used to make inferences about past conditions, but do not provide theoretical support for this claim. Scalise Sugiyama’s research (“Origins,” “Social Mapping,” “Cognitive Archaeology”) provides the missing theoretical link. Because oral folklore content has been shaped by the constraints of memory, the oral traditions of foraging peoples constitute a record of, at least in part, the kinds of information humans are designed to notice, remember, and share with others in a foraging context.

On this view, the oral tradition is a cognitive artifact (Scalise Sugiyama, “Origins,” “Social Mapping,” “Cognitive Archaeology”)—a record of universal patterns of thought that can be examined for clues to past selection pressures and cognitive design. Although the forager oral

traditions available to us do not come straight from the Pleistocene, they are nevertheless the product of foraging cultures: the social and economic conditions under which contemporary foragers tell stories are similar to those under which ancestral humans told their tales. It is therefore plausible that the oral traditions of ancient and contemporary foraging peoples evince thematic continuities. Moreover, the antiquity of narrative points to its content and structure having been shaped by the information storage constraints imposed by a hunting-and-gathering lifestyle. Storytelling is an act of verbal communication; as such, it requires language, which evolved by the time *H. sapiens* migrated out of Africa 100,000 years ago. This date is conservative: the rudiments of language began evolving hundreds of thousands of years ago (Byrne; Dunbar; Falk; Holloway; Pfeiffer; Pinker), and storytelling might not require the full complexity of modern language for its expression: a five-year-old child, with limited vocabulary and imperfect grammar, can tell a story (Pitcher & Prelinger; Sutton-Smith) and “e lengeege weth e smell nember ef vewels cen remeen quete expresseve” (Pinker 354). These converging lines of evidence indicate that oral narrative emerged tens of thousands of years ago.

For the overwhelming majority of its existence, then, narrative has been transmitted orally and stored in the minds of storytellers and their audiences. As a result, the content of oral narrative has been shaped by the limitations of memory—specifically, by the kinds of information the mind is designed to attend to, store, and recall. Information acquisition is a fundamental adaptive problem: each species occupies a different ecological niche, and each niche has different information demands (Hauser). All species must solve the problem of acquiring the information requisite to survival and reproduction in their particular niche. Motivational mechanisms aid in this task: a given object, activity, or phenomenon attracts our interest because it exhibits cues that, in ancestral environments, signaled that it would behoove

us to pay attention to it (Tooby & Cosmides, “Past,” “Beauty”). As they are transmitted from person to person—that is, from mind to mind—oral traditions pass through repeated cycles of this filtering system. The result is a record of information that has been important to human survival and reproduction across time and cultures. Collectively, forager oral traditions constitute a cross-cultural database of the kinds of information humans find interesting, memorable, and—significantly—worth sharing with others. As such, these traditions are a useful device for studying the information demands of the human zoological niche.

For most of their tenure on earth, humans have made their living by foraging, and it is widely agreed that successful occupation of this niche requires extensive, specialized knowledge (Blurton Jones & Konner; Laughlin; Tooby & DeVore). Indeed, foraging peoples are legendary for their vast stores of local zoological and botanical knowledge. Lee, for example, writes that !Kung “tools and techniques of gathering are relatively simple” but the “knowledge of plant identification, growth, ripeness, and location . . . is extremely complex, and the !Kung women are highly skilled at distinguishing useful from nonuseful or dangerous plants and at finding and bringing home sufficient quantities of the best food species available” (*Dobe !Kung* 37).

Reichard writes that Coeur d’Alene men and women are “authorities on bird, animal and plant habits. The most exacting details can be given even today by those few Coeur d’Alene who still cultivate their liking for hunting and fishing” (15). Mardudjara survival is highly dependent on “possession of an extremely detailed and comprehensive knowledge of environmental resources and their utilization” (Tonkinson 31). Cree and Inuit understanding of seasonal cycles, rivers, currents, sea ice, and the food web is so extensive that The Environmental Committee of Sanikiluaq conducted a three-year study of their traditional ecological knowledge to aid in

assessments of sustainable resource development in the Hudson Bay bioregion (McDonald et al.).

Foragers are also expert trackers. Liebenberg's observations of the !Xo of the Kalahari Desert are a case in point:

While tracking down a solitary wildebeest spoor of the previous evening !Xo trackers pointed out evidence of trampling which indicated that the animal had slept at that spot. They explained consequently that the spoor leaving the sleeping place had been made early that morning and was therefore relatively fresh. The spoor then followed a straight course, indicating that the animal was on its way to a specific destination. After a while, one tracker started to investigate several sets of footprints in a particular area. He pointed out that these footprints all belonged to the same animal, but were made during the previous days. He explained that the particular area was the feeding ground of that particular wildebeest. Since it was, by that time, about midday, it could be expected that the wildebeest may be resting in the shade in the near vicinity. (80)

The San peoples are no exception. Brody writes of the Beaver Indians that the "texture and shape of a fresh hoof mark or of droppings clearly show just when animals have been in an area. The angle at which urine has hit the snow tells a hunter whether the moose he is close to is a cow or bull. The distances between hoof marks show an animal's speed and indicate also, changes in speed" (2002). By observing animal sign near camp, Mistassini Cree hunters were able to tell Tanner "the sex and age of [an] animal and where it would be found two days before the hunt occurred" (55). And Tonkinson notes that "a mere glance tells the [Mardudjara] hunter that the marsupial he seeks is not in its burrow" (31).

How do foragers acquire all this knowledge? The answer appears to be--in part—from other foragers. Humans are characterized by a highly developed capacity for information exchange: comparative study of human and non-human primate cognition indicates that, to a greater degree than other species, humans are designed to acquire information from conspecifics (Byrne). Tellingly, Hewlett and Cavalli-Sforza found that, among the Aka, over 99% of 50 daily life skills are learned from others (see also Ohmagari & Berkes), and Dunbar has proposed that language evolved for the purpose of acquiring social information (via gossip). It is highly plausible, then, that the expensive cognitive software underpinning cultural generation and transmission evolved as a means of facilitating and/or augmenting information acquisition. As Biesele notes, “Basic to the adaptation which solved the problem of living successfully under these conditions are first, detailed knowledge and second, devices for remembering and transmitting it” (*Women* 41). Despite the obvious relationship between an information-intense ecological niche on the one hand, and a species designed for information exchange on the other, research aimed at identifying domains of socially learned information in humans is in its infancy.

As a cross-cultural record of information that humans exchange with one another, oral traditions are a logical place to conduct this search. Much of Scalise Sugiyama’s research has been dedicated to identifying information domains comprised by forager oral traditions. She has shown that these traditions contain information relevant to recurrent problems of forager existence, such as manipulating and being manipulated by others, subsistence, predator avoidance, free riding, and wayfinding (Scalise Sugiyama, “Origins,” “Food,” “Narrative Theory,” “Predation,” “Lions,” “Social Mapping”; Scalise Sugiyama & Sugiyama, “Humanized Topography”). An important next step in this research is to conduct cross-cultural, quantitative tests of these findings. The present study is part of that effort, focusing on the problem of

foraging risk. Before we present the results, we will briefly outline key factors that contribute to this perennial and complex problem.

II. Foraging Risk as Adaptive Problem

Although hunter-gatherers were once characterized as “affluent foragers” (Sahlins; see also Lee “Scarce Resources”), this view was always challenged (e.g., Suttles), and current consensus holds that foraging risk is a recurrent feature of foraging life (e.g., Cashdan; Gurven et al.; Kaplan & Hill; Kaplan et al.; LeBlanc & Register; E. Smith; Sugiyama “Illness,” “Patterns”; Sugiyama & Chacon; Winterhalder & Smith). This conclusion is further supported by ethnographic documentation of meat-sharing rules (e.g., Lee, *Dobe !Kung*; Rasmussen *Netsilik*) and exchange networks (e.g., *hxaro*; Wiessner) that diffuse the impact of day-to-day foraging variance among group members, and kinship systems that link individuals across large distances (e.g., Lee, *Dobe !Kung*; Tonkinson; Yengoyan) and allow them to “visit” kin or in-laws in distant territories during periods of local resource failure. Presumably, there would be no need for such systems if resources were always available in sufficient quantities.

The quest for food is unending and continually worrisome, as reflected in Marshall’s comment on !Kung conversation patterns:

Their greatest preoccupation and the subject they talk about most often . . . is food. The men’s imaginations turn to hunting. They converse musingly, as though enjoying a sort of daydream together, about past hunts, telling over and over where game was found and who killed it. They wonder where the game is at present, and say what fat bucks they hope to kill. . . . [Women] gave me the impression of talking more about who gave or did not give them food and their anxieties about not having food. They spoke to me about

women who were remembered for being especially quick and able gatherers. (Marshall 1976)

One of the most poignant testimonies to the inevitability of foraging risk in hunter-gatherer life is given by one of Rasmussen's Netsilik informants:

“I suppose you have seen sufficient of our life up here to understand that there is never too much meat. Of course, there are times when we kill much more than we can eat on the spot, for instance in autumn when the caribou gather in herds to leave our country. The same is the case when the trout are many in the rivers near the time when the ice spreads over the lakes. In times like these we often feel we have so much food that we will not be able to eat it all. But whoever does that forgets the many, many days in winter when we can find no food at all; he forgets that the caribou go away from our country and that even the seals may disappear or snowstorms prevent us from finding their breathing holes. And so the man that is wise never lolls about idle when the weather is good; he can never know when bad days may eat up his meat caches and drive him and his family into starvation.” (*Netsilik* 134)

Of course, many of the foraging peoples upon whom modern cultural anthropological research is based live in marginal environments that are difficult to make a living in and thus are unrepresentative of ancestral foraging conditions (Kelly; Lee & DeVore). However, the problem of resource variability is not unique to marginal environments. In all habitats, resource quantities fluctuate from year to year and sometimes fail completely, due to such factors as natural disasters, pestilence, disease, human error, and variation in climate, population cycles, and animal migration patterns. Even the famed abundance of the Pacific Northwest Coast

periodically failed. Suttles argues that this area “did not provide an ever-reliable abundance of natural resources simply there for the taking. Abundance there consisted only of certain things at certain places at certain times and always with some possibility of failure” (58), and Mackay reports that the Mowachahts (Nootka) of Vancouver Island suffered a severe food shortage in the winter of 1786 (Fisher & Bumstead 180-181).

Moreover, conflict between foraging peoples might have pushed less aggressively formidable groups into marginal habitats long before the advent of modern agri-industrial civilizations. Contemporary Yanomamö forager-horticulturalist populations illustrate this point. Chagnon argues that the greater incidence of warfare among lowland than among highland Yanomamö might be due to the greater difficulty of making a living in the highlands. The largest, most aggressively formidable groups are able to occupy the more desirable lowland areas, while smaller, weaker groups are driven into the more rugged highland areas. A similar phenomenon is recorded in a set of aboriginal rock carvings at Manly, Australia. One grouping contains the figures of a wallaby footprint, a kangaroo, a man-figure, and a weapon, which indicate that “the Wallaby totem tribe occupied that country, and the Kangaroo totem tribe came and did battle with the Wallaby totem tribe and drove them away and took possession” (W. Smith 92). The frequency with which territorial takeovers occurred in human evolution is unknown, but such takeovers occur among our closest relatives, the chimpanzees (Goodall; Wrangham), and Stringer and Gamble attribute the *H. sapiens* diaspora and replacement of earlier hominid populations to competition over resources. They argue that the “mechanism behind the spread of this modern morphology and any accompanying behavioural pattern would have been population growth. . . . Successful and more intensive use of resources would have demanded a continual quest for further resources and new territories. . . . Economic competition

for the available resources would be the mechanism of replacement of one population by another where there was coexistence” (72). And in a survey of prehistoric small-scale societies, Le Blanc and Register found that “people seemed to fight over scarce resources. For most of the time in the past, the most scarce resource was the most basic: food” (9). The prehistoric human landscape may have been dotted with populations of haves and have-nots: relatively large, concentrated populations inhabiting resource-rich territories but under continual pressure to harvest resources more intensively, and smaller, more dispersed populations scraping a living in the marginal, less reliable habitats to which the former had driven them.

Another factor that affects access to resources is disease and disability. Injury and illness occur in all habitats, and can prevent a person from foraging for days—even months—at a time (Sugiyama, “Illness,” “Patterns”; Sugiyama & Chacon). Because the human foraging adaptation is characterized by food sharing (Kelly), disease and disability negatively impact the caloric and nutritional intake not only of the forager but of his or her dependents as well (Sugiyama, “Illness,” “Patterns”; Sugiyama & Chacon 2000). Sugiyama and Chacon found that the nutritional and caloric intake of a group is significantly reduced when the best hunter is incapacitated due to illness or injury (Sugiyama & Chacon). Fatal injury or illness exacerbates these effects on dependents by permanently eliminating a resource provider. Hill and Hurtado (1995) tell of an Aché woman whose husband was killed by a jaguar the day before she gave birth to their first child. She was immediately encouraged by the group to marry another man so that she would have someone to provide for her and the infant.

Finally, foraging risk can be reduced or increased by habits of character. Universally, foraging peoples encourage generosity, industriousness, competence, frugality, and humility and scorn stinginess, laziness, gluttony, prodigality, and arrogance (e.g., Honigman; Lee, *!Kung San*).

Among the Ahtna, for example, “The education of children was to produce *skilled and lucky hunters* and *industrious and accomplished housewives*. *Laziness, improvidence, stinginess, lying, stealing*, and spreading malicious gossip were countered by admonition, spankings . . . [and] by rigorous physical training (early rising, running, hard work, cold baths)” (de Laguna & McClellan 657, emphasis added). Boehm claims that among the proscribed behaviors that “all human groups watch for, gossip about, and react to” are “theft, and stinginess or failure to cooperate when this is appropriate” (73).

Not surprisingly for such a gregarious species, humans use a variety of social strategies to buffer day-to-day and catastrophic foraging risk, such as meat distribution rules (e.g., Lee, *Dobe !Kung*; Rasmussen, *Netsilik*), territory-sharing networks (e.g., Lee, *Dobe !Kung*; Tonkinson; Yengoyan), and even ceremony: Mithen (*Thoughtful*) argues that certain rituals may function to store and transmit information that is used at intervals longer than a human lifetime, such as proper processing of toxic plants that are only eaten in time of famine. Behavioral ecologists have proposed that humans depend on conspecifics for critical subsistence information (Heffley; Kurland & Beckerman; Moore), and a number of researchers have argued that certain instances of art behavior are strategies for mitigating resource variability. For example, the proliferation of cave art in Upper Paleolithic Europe is believed to have been a response to a pronounced change in climate that precipitated changes in faunal dispersal patterns, which required new hunting tactics and techniques, the transmission of which was facilitated by visual imagery (e.g., Conkey; Gamble; Jochim; Madden; Mithen, *Thoughtful*). Additionally, forager men are known to acquire considerable hunting knowledge from narrative—that is, from listening to others recount their hunting experiences (Biesele, “Sapience” 940; Blurton-Jones & Konner; Laughlin 308; Leacock 14; Nelson 374).

This brings us to the question, What kinds of information do humans acquire through social learning? As noted above, the oral traditions of foraging peoples contain information useful to solving a wide range of recurrent problems of forager existence, such as manipulating and being manipulated by others, subsistence, predator avoidance, free riding, and wayfinding. Evidence suggests that forager narrative might also be used to transmit information relevant to buffering foraging risk: Sobel and Bettles report that Klamath and Modoc folklore contains information regarding strategies that are deployed in time of famine. Our own research (below) shows that the opposite impulses of stinginess/generosity, laziness/industriousness are recurrent themes in forager folklore, suggesting that storytelling might also be used to discourage antisocial behaviors and encourage pro-social behaviors that impact foraging risk. This hypothesis is congruent with the accepted wisdom among indigenous storytellers, folklorists, and anthropologists that traditional tales serve, in part, to illustrate appropriate and inappropriate behaviors and their consequences (Scalise Sugiyama, “Social Mapping”). It is also congruent with Boehm’s argument that, in small-scale societies, social sanctions—e.g., gossip, the cold shoulder, open criticism, derision—are used to check antisocial impulses. Storytelling offers a proactive means of accomplishing the same end, by showing group members how they will be treated if they behave badly and, conversely, how they will be treated if they behave well (Scalise Sugiyama, “Social Mapping”). Finally, our hypothesis is also congruent with Kelly’s observation that “acts of sharing come no more naturally to hunter-gatherers than to members of industrial societies. Children in hunter-gatherer societies are enculturated into the idea of sharing at an early age” (164). In short, it seems plausible that, among other things (e.g., Scalise Sugiyama, “Origins,” “Food,” “Predation,” “Lions,” “Social Mapping”), foragers use oral traditions to inculcate values that buffer foraging risk and to discourage values that exacerbate it.

In the next section, we present cross-cultural evidence that oral narrative is used to store and transmit information regarding subsistence shortfalls and behaviors that impact foraging risk.

III. Study Design and Results

Hunger, starvation and the search for food are recurrent refrains in forager oral traditions, although they are more pronounced in some traditions than others. Boas, for example, notes that “[s]tarvation stories of the Kwakiutl occur particularly among the tribes living at the heads of the inlets of the mainland, not among those who dwell near the open sea, where seals, sealions, salmon, and halibut are plentiful” (*Kwakiutl Culture* 173). In contrast, de Laguna writes that the “dominant, overriding concern in all the Dena tales is food. There is a very strong emphasis on eating and on the fear of being eaten, clear evidence that the struggle for food in this harsh environment has been a constant one, and that the specter of starvation is never remote” (317). She adds that, “every tale mentions some aspect of the food quest—hardly surprising, since in reality this occupied most of aboriginal Native life in the seasonal round” (317). This observation is echoed by one of Rasmussen’s informants: ““In the old days . . . men hunted only with bow and arrow and knew nothing of the white man’s firearms. It was far more difficult to live then, and often men could not get food enough. The caribou were hunted in kayaks at the crossing of rivers and lakes, being driven out into the water where they could be easily overtaken in a kayak. But it was hard to make them run the way one wished”” (*Caribou* 56).

The problem of foraging risk is indirectly expressed through censure of behaviors that exacerbate it, including stinginess, gluttony, unfair distribution of meat, arrogance, and laziness (e.g., Biesele, *Women*; Lee, *Dobe !Kung*; Wilbert & Simoneau, *Yanomami*). The trickster character is a case in point, embodying all of these qualities: he is typically a lazy person who

prefers to acquire food by theft or trickery, reneges on his promises to share with others, eats to excess, and is completely without shame (Scalise Sugiyama, “Social Mapping”). Although admired for his intelligence, the trickster is condemned for his antisocial tendencies (Goodwin; Opler, *Jicarilla*; Street; Toelken). The universal distribution of this character lends credence to the hypothesis that narrative is one of the means forager groups use to police the behavior of their members, and is in keeping with Boehm’s claim that forager groups vigilantly monitor, gossip about, and ostracize members who steal, horde, and/or refuse to cooperate (73).

Incidentally, Boehm further notes that “foragers talk about generosity, cooperativeness, honesty, and other prosocial behaviors that involve good will” (73), an activity for which there is also a narrative correlate--the hero genre; however, due to space limitations, discussion of this genre will be taken up elsewhere (Scalise Sugiyama & Sugiyama, “Heroes”).

Although anecdotal evidence indicates that information regarding foraging risk is widespread across forager oral traditions, this hypothesis has not been systematically tested with cross-cultural data. We know of only one quantitative study of foraging risk information in forager folklore: as noted above, Sobel and Bettles document references to, causes of, and coping strategies for famine in 34 Klamath and Modoc myths. It remains to be seen whether this theme—or any other—is statistically universal among foragers. To this end, we are assembling a random stratified cross-cultural sample of forager folklore collections (the Forager Folklore Sample, or FFS). The FFS will be used to conduct content analyses to test hypotheses regarding the domains of information comprised by oral traditions and, by implication, the kinds of information humans acquire socially. To compose the FFS, Murdock’s *Ethnographic Atlas* was searched for forager groups. Basis for inclusion of a culture was 76-85% dependence on gathering, hunting, and/or marine animals (a score of 8 or more in columns 7-9 of Table A). A

stricter criterion of 100% dependence on gathering, hunting, and/or marine animals would have greatly reduced the sample size for the regions of East Eurasia, Insular Pacific, South America, and parts of North America (e.g., the Southwest), and would have excluded forager-horticulturalist societies. This survey yielded 206 culture groups in 83 clusters from 5 of Murdock's 6 geographical regions (no culture groups were found in the Circum-Mediterranean because foragers disappeared from this region before the onset of historiography). The next step, which is currently in progress, is to choose one culture at random from each of the 83 culture clusters, and conduct a book search for comprehensive collections of that culture's folklore (e.g., "Yanomamö" + "folklore"). If no collections for that culture are found, another culture is chosen randomly from that cluster, and the search process repeated. When multiple collections are found, the collection with the greatest number of stories is chosen. It may be that for some clusters, no collections exist; thus, the FFS might ultimately comprise less than 83 clusters.

Here we present the results of a trial content analysis of the FFS in its present (incomplete) state, consisting of 24 collections from 5 geographical regions (Sub-Saharan Africa, East Eurasia, Insular Pacific, North America, South and Central America). The trial sample is biased toward North and South American culture groups, partly because the FFS is currently incomplete, but primarily because, proportionally, Murdock's *Ethnographic Atlas* contains many more foraging cultures (as defined by the above criteria) from these geographical regions than from others: 0 from the Circum-Mediterranean, 5 from Sub-Saharan Africa, 8 from East Eurasia, 12 from the Insular Pacific, 161 from North America, and 20 from South and Central America. Collections were analyzed simply to determine whether they contained information relevant to buffering foraging risk; future analyses will examine how many different kinds of foraging risk information are contained in each collection. For the present study, collections were searched for

three general categories of information: information that (1) calls attention to the problem of foraging risk and the cues/causes associated with it; (2) condemns behaviors that exacerbate foraging risk (stinginess, greediness, gluttony, laziness, arrogance); and (3) models behaviors that mitigate foraging risk (e.g., sharing, generosity, industriousness, humility). Of 24 collections, 23 (96%) contained information relevant to foraging risk (Table 1). The one exception—the Aranda collection—is an interesting one. The tales are chock full of foraging information: virtually all of the stories revolve around the creation by ancestral beings of specific resource sites, the resources themselves (e.g., water holes, game animals, plants), and the landmarks used to locate them. However, because the stories never mention hunger or famine, we determined that the collection does not contain information regarding foraging risk *per se*.

[Insert Table 1 here.]

In the remainder of this section, we identify and illustrate different kinds of foraging risk information found in forager oral narrative. Although the FFS contains only one folklore collection from each culture cluster, this part of the discussion has been broadened to include story collections that are not part of the FFS. Our intention was to give the reader a feel for (1) the range of foraging risk information contained in forager oral traditions and (2) the kinds of information we judged relevant to buffering foraging risk.

Frequency of resource shortfalls. Like the story of the grasshopper and the ants, references to times of hunger or conditions that precipitate famine may keep people mindful of the fact that resources periodically fail. A Warao story, for example, references the fact that fish are sometimes plentiful and sometimes scarce. In the story, an old man gives a young man a small bundle and tells him not to open it. Naturally, the young man's curiosity gets the better of

him: he opens the package and heaps of roasted fish spill out. The old man re-ties the bundle and re-issues his instructions, but the young man opens it a second time. At this point, the old man says, ““Now he fixed it. For that reason all the Indians will be poor. It will be that they suffer. If I don’t wish it they will find no fish. If I wish it they will find some”” (Wilbert, *Warao* 111). Stories can also call attention to the fact that, although certain seasonal periods of resource shortfalls are predictable, the onset, intensity, and duration of these periods are not. For example, ethnographic accounts of the Klamath and Modoc peoples “indicate that although winter was a predictable annual event, the resultant advent and degree of subsistence stress were not” (Sobel & Bettles 282-283). On this point, a Chipewyan story begins, “Once it continued to be winter for two years. There were no geese in the country. . . . The ice never thawed during all this time. The Indians could not dig holes for their nets. They made big fires, heated stones red-hot, and threw them on the ice, but it was too thick to be broken through. The Indians were beginning to starve. Towards springtime there was a little thawing, but then it became winter once more. Many died of starvation” (Lowie, *Chipewyan* 186). References to famine might also give people a feel for the frequency with which it occurs. On this point, the collectors of forager tales often perceive a correlation between the frequency with which the theme of hunger occurs in a people’s folklore, and the frequency with which it occurs in real life (e.g., Boas, *Kwakiutl Culture* 173; De Laguna 317). Goddard, for example, observes that the “struggle to secure a sufficient supply of food seems to have been especially severe for the Beaver. In many of the stories . . . the statement is made that the band in question is starving” (213). Of the 85 stories Goddard recorded, 19 (22%) mention starvation or a lack of food.

The vulnerability of even the richest habitats to periodic resource failure is reflected in an Ainu story that begins, “There was a very populous village. It was a village having both plenty

of fish and plenty of venison. It was a place lacking no kind of food. Nevertheless, once upon a time, a famine set in. There was no food, no venison, no fish, nothing to eat at all; there was a famine. So in that populous village all the people died” (Chamberlain 12). Nor are food shortages confined to wintertime: a Chipewyan story reports that, “Once in the summer, the Indians had neither fish nor game to eat” (Lowie, *Chipewyan* 187.)

Other stories reflect the vagaries of day-to-day foraging luck. In a Copper Eskimo story, the wolf people go out to hunt caribou one day and come home empty-handed. They proceed to discuss “what the reason might be that the caribou had been shy that day. For they had not been able to get near them” (Rasmussen, *Copper* 225). They attribute their bad luck to the violation of taboo: a hungry child had been given the hind-leg sinew of a caribou to chew on. In a Thompson story, Coyote is hunting while traveling through the Nicola Valley but not having any luck. His wife is the daughter of Elk chief, so he decides to eat her; he snaps at her but she escapes (Teit). The Kiowa tell of a camp in which “there was a group of hunters who went out to hunt game. They were never successful in finding the game, for some reason they did not understand. Every time they went hunting, the game scattered and was hidden where it could not be killed. This caused the people to starve” (Parsons 21).

Inter-specific competition. Humans must often compete with other animals for food, and this problem, too, is reflected in folklore. For example, a Dena story tells of a time when the people were starving because Brown Bear placed his fish trap downstream of their fish camp. Brown Bear caught all the fish as they swam upstream, so that none of them reached the people’s camp (de Laguna 89). For those forager groups who store food, theft of stores by other animals can be a problem, as illustrated in a Thompson tale that begins, “It was winter, and many people were living in a large underground lodge. . . . The people were losing their food-supplies, but no

one knew who was stealing them” (Teit 22). The culprit turns out to be Bush-Tailed Rat. The people punish him by transforming him: “Henceforth you shall be a rat, and shall steal only a little at a time” (Teit 22). Similarly, the Copper Eskimo tell a story about a group of men who find a polar bear busily devouring their meat cache (Rasmussen, *Copper*).

Intra-specific competition. As noted above, population displacement due to warfare may force people into marginal habitats where making a living is more precarious. For example, Bogoras recorded a story that tells of an attack on a small Lamut band by a large group of Chukchee, who sought to kill the Lamut and steal their reindeer. Those Lamut who managed to escape “rode across the mountain-ridge, and fled to steep rocks along the narrowest paths, so that the Chukchee sledges could not follow their riding reindeer. . . . At last they came to the mountains of Oloi. The pursuers were not there, so they stopped, and after a while pitched their tents” (Bogoras 19918:29). Even if no displacement occurs, warfare can disrupt normal subsistence patterns, precipitating or exacerbating resource shortfalls. The latter problem is illustrated in a Beaver story about a starving band desperately traveling to a lake known to have fish. They arrive only to find their enemies the Cree encamped there. Not only are they cut off from their anticipated food supply, but they are discovered and attacked (Goddard 280). A related issue is population growth, which, as Stringer and Gamble argue, may periodically have sparked competition for available resources and pressure for territorial expansion. An aboriginal story references this problem:

Long, long ago all the bush birds and animals lived in a big, deep valley that was hemmed in on every side by high, rough hills. Food had become very scarce, and all the birds and animals held a special meeting to discuss how it could be procured. . . . the tortoise proposed that the big eagle-hawk, the fierce king of birds, who was a great

hunter, should fly over the ranges and find food. . . . When the eagle-hawk had gone a long way over on the other side of the ranges he saw a beautiful country full of all kinds of food, but he saw no birds or animals there, except one little willy-wagtail. So the eagle-hawk said to the little willy-wagtail, “May I fetch my brothers and sisters, who are starving, into this beautiful country of yours?” (W. Smith 118-119)

Another form of intra-specific competition occurs between women. A Sanpoil story tells of a man who takes a second wife and keeps her in a separate household, giving most of his meat to her. The first wife sends her son to ask his father for meat, but he is refused and his father’s new wife laughs at him. The boy reports back to his mother, who kills her children and herself (Gould 112-113). The Cowlitz tell a story that alludes to the same problem. In this story, three prominent local peaks--Mount St. Helens, Mount Rainier, and Mount Adams--are personified as a man and his two wives. The wives have many children and are always quarreling. One day, things come to a head and Mount Rainier, the stronger of the two wives, kills Mount Adams’ children (Adamson 268).

Injury/illness/mortality. As noted above, illness and injury can leave an adult incapacitated for days or weeks, making foraging impossible and drastically reducing the caloric and nutritional intake of dependents (Sugiyama & Chacon 2000; Sugiyama 2004, 2005). The death of a provider makes these circumstances all the more dire. This problem is stridently expressed in a San story about a man who is accidentally shot while hunting by his fellow group members, who don’t see him through the dust. In the midst of her grief, his widow is faced with an acutely pressing problem--how to feed herself and her children. She complains that “my children grow ugly. For their father used to bring them good things. They ate fat when their

father was alive” (Lewis-Williams 64). Her options are to remarry or go live with her parents and siblings. The first option is less than appealing, as she explains:

“I shall have to marry an ugly man, a man who is not nice. I shall not eat good things with him. I shall have to marry a greedy person who loves fat. I shall not eat fat with him, so that I can grow nicely fat and fatten my body; so that my children may eat fat and not have to crunch bones. A different sort of man will not give food to my children. He will eat the things himself. Because he is a greedy person, we shall eat bad things, things that are not good. He is a bad man. He eats far away; he eats up things on the hunting ground. He brings ugly pieces of meat to the house. We eat them, things that are hard, things that are not tender; our teeth ache. These pieces of meat are not good. Our children are ugly because they have to eat bones. Therefore they starve.” (Lewis-Williams 66)

The second option is equally problematic: her father is so old he can no longer hunt. He and her mother are supported by her brother, who has a wife and children of his own to provide for, and whom she must now ask to support herself and her children as well.

Adverse environmental conditions. Weather conditions may thwart hunting efforts, as seen in the Gros Ventre story about how summer was obtained: “There was deep snow, and the people had nothing to eat” (Kroeber 65). There are no buffalo to be found, and the people are starving. A Kiowa tale strikes a similar note: “The snow stayed a long time on the ground. The people were out of buffalo meat, they were starving” (Parsons 53). Similarly, a Sanpoil tale begins, “One winter there was a very heavy snow, and the people were starving. A man lived alone with his wife and children. On account of the snow, he was unable to kill any game”

(Gould 113). In a Yukaghir tale, a man goes out to check his traps, when “all at once there came a heavy snowstorm. He lost his way and struggled on not knowing where he went.” He finds shelter under a river bank and makes a fire, “waiting for better weather” (Bogoras 10). Adverse weather may impact the foraging success of an entire group, or a single individual. An Ainu story tells of a fisherman who is blown out to sea by a great wind and drifts about for six nights, nearly dying (Chamberlain 39). Natural disasters are another cause of resource shortages, destroying local plant and animal food supplies and prompting surviving animals to flee. This phenomenon is reflected in an Ainu tale about the beginning of the world that, in volcanically active Japan, could just as easily refer to the recent past: “In very ancient days, when the world had just been made, everything was still unsettled and dangerous. The crust of the earth was thin, and all was burning beneath. For this reason, the people did not dare to venture outside of their huts even to obtain food: for they would have scorched their feet” (Chamberlain 19).

Incompetence. Poor hunting abilities impact not only the hunter, but those who depend on him for food. Not surprisingly, references to the relative hunting abilities of men are common in forager folklore. The Yukaghir tell of a man who was an unsuccessful trapper: “Sometimes he would catch one hare, another time he would catch two. With these he fed his family” (Bogoras 10). One day the man does a favor for the Wood-Master who, in return, grants the man’s wish to have “plenty of food for all of my life” (Bogoras 11). The Wood-Master tells him to go into the forest the next morning and set five self-acting bows. The man does as he is told and when he returns to the bows in the evening, five elk have been killed. “After that, he would catch five elks every time” and he “lived in plenty until his death” (Bogoras 12). References to hunting skill often take the form of contests. For example, in a Chamacoco tale, Jaguar invites Doxóra-- who is known as a “great hunter and marksman”—to go hunting with him; Doxóra agrees,

saying “We’ll . . . see who is the better marksman!” (Wilbert & Simoneau, *Chamacoco* 385).

In a Bororo tale, Méri challenges his younger brother Ári to a shooting contest for the same purpose: “Let’s shoot arrows at each other to see which of us is the better bowman” (Wilbert & Simoneau, *Bororo* 34). Among the Ingalik, Crow is known for being a poor hunter. One day he is out hunting and can’t see anything, so he pulls out his intestines and takes them home to his family, passing them off as bear guts: “I was going up the river and I saw a bear away up on the hillside. I shot at it and killed it, but it rolled down and caught on the rocks. I couldn’t get it, but I got a hook and pulled the guts out. That’s all I could get” (de Laguna 262; for a similar story see Biesele, *Women*). The Inuit, too, tell of a man who habitually attempts to mask his hunting incompetence by lying. One day this man, Kasiagsak, tells the people in his camp that he has found a whale carcass and offers to lead them to it. They travel a great distance but, of course, never find the whale. In exasperation, the people “put a stop to all his fibs by killing him then and there” (Rink 297). The Beaver tell a story about a strong man who steals a weaker man’s wife, but is unable to provide for her and her children: he “hunted a good deal but did not kill anything” (Goddard 274). Finally, worried that his children will starve, the weaker man kills some caribou and takes it to them. The wife-stealer reacts by trying to hide his hunting incompetence: he

went away hunting the next morning and came home in the evening. His leggings were covered with frozen blood. He did not bring back meat but said they would go for it in the morning. When they came where he claimed to have killed the animals it was apparent the caribou had run away from him. The blood on his leggings was from his nose. He had broken pine brush and covered it with snow thinking it would be mistaken for caribou carcasses. (Goddard 275)

After this incident, the man who stole the wife gives her back, concluding that he is “not capable enough around the camp to have the responsibility of a wife” (Goddard 275). The relationship between hunting competence and marriage is the subtext of the Yanomamö myth of Naro, in which Honey and Possum compete for the affections of the Dove girls. Honey is described as being handsome, hard-working, and a good hunter, whereas Possum is stinky, lazy, and such a poor hunter that he cuts off a piece of his thigh and tries to pass it off as tapir meat (Wilbert & Simoneau, *Yanomami* 229).

Laziness. Hard work done without complaint is a universal forager value, and is reflected in their oral traditions. Coeur d’Alene stories, for example, “imply that laziness is almost a crime” (Reichard 50). One story tells of a chief who abandons his grown daughter because she spends her days playing with her baby brother and all the other little children instead of “learning to work like the women” (Reichard 187). A Puyallup tale tells of a family with two sons who “were considered lazy and slothful by other families.” The villagers complain to the boys’ parents: ““Why don’t you train your children as we do? They’ll never amount to anything!”” (Adamson 353-354). The Crow, too, tell a story about a lazy son. This boy “did not do anything. In the morning he got up when the sun was high and after breakfast he would lie down again” (Lowie, *Crow* 136). One day his father scolds him: ““There will be nobody visiting this camp who shall say he wants to see my son. No one will come in to beg for meat killed by my son”” (Lowie, *Crow* 136-137). The next morning, the boy gets up before anyone else, rides off, and kills two deer. Conversely, industriousness is noted with approbation: a Puyallup version of the “Star Husband” tale begins, “Five very industrious sisters lived in a certain village. They always gathered the food for the family” (Adamson 365).

Stinginess. In many forager groups, day-to-day or seasonal survival depends on food sharing: on any given day, those who have killed game share with those who have not. Accordingly, sharing is a cherished value, and a common folklore theme. In Coeur d'Alene folklore, for example, "Much stress is laid upon the dispensation of food. A stingy person was despised" (Reichard 51). In a Kwakiutl tale, Heron repeatedly eats up all the salmon he catches without giving any to his children, who are starving. One of the children shoots Heron and his wife, Woodpecker Woman, and they turn into birds (Boas, *Kwakiutl Tales* 187-191). In a Thompson tale about the origin of death, Raven is described as a "bad, selfish chief" who "wanted the game for himself" (Teit 1). A Copper Eskimo story tells of a woman who gives her blind son only trout liver mixed with excrement to eat, and keeps the rest of the fish for herself. The son's sight is restored by a loon, and he begins to harpoon salmon. On the pretext of helping his mother hold onto the fish he has caught, he loops the line around her wrist. Then he releases his hold on the line and she is dragged down into the water (Rasmussen, *Copper* 204-205). The widely diffused story of Clotted Blood begins with a breach of meat-sharing etiquette: although the old man does all the butchering, his son-in-law does not give him any meat (e.g., Kroeber 82). The Selknam culture hero, Kwányip, is extremely selfish: "He and his family never lacked for meat, never suffered hunger. To the other people Kwányip distributed nothing" (Wilbert, *Selknam* 32). The Aranda tell a story about the crow and his son, the bandicoot, in which the crow offers to share his roots with the bandicoot, but the bandicoot hides his roots from the crow and eats them in secret (Strehlow 19). Kingfisher's wife and children desert him when they find out that he has been roasting and eating salmon away from home, and bringing them only the tails (Kroeber & Gifford 83). The Yukaghir tell of an old man who fakes his death to avoid sharing food with his family. He tells his family that he is going to die, and instructs them to

place his body in an abandoned hut, along with a kettle, an axe, some fire-making materials, and some food. After his death, his family see smoke coming from the hut, and when they peek inside, find him cooking fresh meat: “Before he feigned death he had killed a big fat elk, and had hidden it in the hut; and he now was eating it all alone” (Bogoras 49). His wife sends a ptarmigan to the hut to lacerate the old man’s body with its talons, and later beats him on the head with a poker.

Closely related to stinginess is gluttony--taking more than one needs. In the hunting contest between Jaguar and Doxóra mentioned above, Doxóra hits his tapir but Jaguar misses and, when Doxóra isn’t looking, pulls out the latter’s arrow and substitutes his own. Doxóra is wise to Jaguar, but plays along, asking Jaguar for a piece of the meat. Jaguar replies: “I’m just going to give you what I feel like giving, which is only a little bit” (Wilbert & Simoneau, *Chamacoco* 385). He gives Doxóra a few small pieces, and keeps the rest of the tapir for himself. In a Kiowa tale, four turkeys warn Sendeh not to eat too many tubers, but he ignores them, saying “I am going to eat all I want” (Parsons 42). The turkeys only eat a little, but Sendeh eats until he has a stomach ache, and suffers a violent bout of flatulence.

IV. Concluding Remarks

The oral traditions of foraging peoples constitute a vast natural experiment: a test of the kinds of information humans are designed to remember and share with others in a foraging context. Although contemporary foragers are not unproblematic models of ancestral *H. sapiens*, reconstructing the demands of ancestral human life using quantitative study of forager folklore is just as legitimate as using quantitative study of forager subsistence, settlement patterns, or life history. Use of these traditions to develop a random stratified sample of forager folklore

collections will provide a new source of cross-cultural data on the kinds of information exchange elicited by foraging environments. Despite longstanding interest in delineating the general design principles of cultural transmission (e.g., Boyd & Richerson; Cavalli-Sforza & Feldman; Cosmides & Tooby, “Cognitive,” “Neurocognitive”; Henrich et al. 2004; Richerson & Boyd; Sperber, “Anthropology,” “Modularity”; Tooby & Cosmides, “Past,” “Psychological”), only a few scholars have examined specific cultural transmission media in terms of the information demands of ancestral environments (e.g., Coe; Dunbar; Hagen & Bryant; Miller; Mithen, “Thoughtful,” “Singing”). Even fewer have examined the role of narrative in the context of these demands (Scalise Sugiyama, “Origins,” “Food,” “Narrative”, “Predation,” “Lions,” “Social Mapping”; Sobel & Bettles; Tooby & Cosmides, “Beauty”). The FFS is not only a new approach to the study of social learning, but it is particularly useful at this moment in human history, when foragers are rapidly becoming culturally extinct and field study of this mode of existence will soon be impossible.

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