Food, foragers, and folklore: the role of narrative in human subsistence

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Abstract

Narrative is a species-typical, reliably developing, complex cognitive process whose design is unlikely to have emerged by chance. Moreover, the folklore record indicates that narrative content is consistent across widely divergent cultures. I have argued elsewhere that a storyteller may use narrative to manipulate an audience’s representations of the social and/or physical environment to serve his or her own fitness ends. However, my subsequent research suggests that such manipulation results from a broader selection pressure which narrative effectively alleviates: information acquisition. By substituting verbal representations for potentially costly first-hand experience, narrative enables an individual to safely and efficiently acquire information pertinent to the pursuit of fitness in local habitats. If this hypothesis is true, narrative should be rich with information useful to the pursuit of fitness. One class of information integral to the accomplishment of this task is foraging knowledge. In this paper, then, I present evidence that foraging peoples use narrative to transmit subsistence information: specifically, I demonstrate how various narrative devices (e.g., setting, description, mimicry, anthropomorphism) are used to communicate foraging knowledge. © 2001 Elsevier Science Inc. All rights reserved.

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1. Introduction

Most likely, the organic capacities that allow culture to be stored and transmitted arose through the action of natural selection. (Boyd & Richerson, 1987, p. 66)
Narrative is a cross-cultural phenomenon crying out for explanation. Literate or not, all societies practice some form of storytelling (Brown, 1991; Murdock, 1945). Moreover, the capacity for narrative is found universally across individuals within cultures. Although narrative skill varies from person to person, the ability to generate and process narrative is not limited to the exceptionally intelligent, nor is any formal instruction necessary for the acquisition of this faculty. Studies of Western children indicate that storytelling ability is reliably developing: the ability to tell stories emerges between the ages of 2½ and 3 (Sutton-Smith, 1986, p. 69; see also Brown & Hurtig, 1983; Mancuso, 1986), and children as young as 30 months can distinguish between narrative and nonnarrative uses of language (Olson, 1997). If narrative were a cultural invention, one would expect to find evidence of its having spread by contact and of its being extremely elaborated in some cultures and absent in others. This is not the case. Although subject matter is often borrowed from other cultures, the practice of storytelling itself emerges independently among even the most isolated peoples. Additionally, narrative is highly elaborated across all human cultures — including the most technologically simple societies — as would be expected if it were “an ancient and central part of human life” (Cosmides & Tooby, 1992, p. 164). Moreover, narrative content exhibits thematic consistencies across widely divergent cultures. Studies of worldwide variants of specific folktales (e.g., “Cinderella”) and the classification of folktales by subject matter (i.e., motifs) have demonstrated that certain topics occur cross-culturally: cosmology, topography, animal characteristics and behavior, plant characteristics, birth/death, and a wide array of topics that may be loosely categorized as “human social behavior” — for example, sex, marriage, religion, proscriptions, deception, and violence (Arne, 1961; Cox, 1893; Edmunds & Dundes, 1983; El-Shamy, 1995; Thompson, 1957; Waterman, 1987). Finally, narrative is a highly complex psychological process, depending for its operation upon the integration of numerous cognitive mechanisms (e.g., cause-and-effect reasoning, theory of mind, language, spatial reasoning). In sum, the narrative faculty meets many of the standards of “special design”: it is species typical, reliably developing, and exhibits a degree of complexity that is unlikely to have arisen by chance (Williams, 1966). If narrative were an adaptation, however, we would expect it to serve an adaptive function — not necessarily in the modern industrialized world, but certainly in the hunter–gatherer conditions under which it emerged. Although recently several important works (e.g., Carroll, 1994; Storey, 1996) have examined literature as the product of a psyche designed by natural selection, no study has been made of the selection pressure(s) to which narrative may be a response or the task it may have performed in our hunting-and-gathering past.

At first glance, Biese’s (1993) important work on Ju’hoansi folklore may appear to be an exception to this rule. She argues that the oral traditions of foraging peoples are “adaptive” in that they function as a means of exchanging information useful to a foraging existence and as a means of inculcating social norms (by condoning or condemning the behavior of story characters). It is not clear from her discussion, however, exactly what she means by “adaptive” (she does not discuss narrative relative to the criteria for adaptation) or where the adaptiveness of narrative lies (in storytelling itself or in artistic expression in general). For example, although she discusses certain characteristics of narrative that make it memorable (e.g., conflict, agonistic tone, sequential events), she does not probe the adaptive logic underlying the memorableness of these features, nor does she attempt to identify those
features that make it uniquely well-suited to the function it performs. Finally, she does not identify the proper domain of storytelling — i.e., a single adaptive problem to which narrative offers a unique adaptive solution — but instead posits several actual domains.

While it is impossible to pinpoint the birth of narrative, a number of lines of evidence indicate that it emerged in the Pleistocene, which would make narrative a sufficiently ancient phenomenon to have developed through the process of natural selection. Most scholars situate the emergence of language — an obvious prerequisite for oral narrative — between 50,000 and 250,000 years ago (Dunbar, 1996; Pinker, 1995). Perhaps the most reasonable estimate is offered by Miller (2000, p. 260), who observes that, given its universality and complexity, language most likely emerged by 100,000 years ago, when *Homo sapiens* began spreading out of Africa. Although the oldest known written narrative (*The Epic of Gilgamesh*) dates back only 5000 years (Sandars, 1972), the written literary traditions of many ancient cultures are known to be rooted in long-standing oral traditions (Lord, 1991; Thomas, 1989). It is thus reasonable to assume that oral narrative preceded written narrative and that the human capacity for narrative did not suddenly spring into being with the development of writing. The fact that many modern foraging peoples have rich and complex oral traditions suggests that storytelling predates the emergence of agriculture. Other forms of symbolic expression, such as the cave paintings, Venus figurines, and engraved bone and antler that have been found at various sites throughout Europe, date back approximately 30,000 years (Gamble, 1983; Jochim, 1983; Mithen, 1998; Pfeiffer, 1982) and rock paintings in Australia may date back even farther (Dissanayake, 2000). Moreover, it appears increasingly certain that red ochre was being used in Africa (possibly for body ornamentation) as long as 100,000 years ago (Knight, Power, & Watts, 1995). Since humans were physiologically capable of speech at the time they began producing these artifacts (Hewes, 1989; Laitman, 1983; Lieberman, 1989), it is highly plausible that storytelling is at least as ancient as these other representational forms. Based on these converging lines of evidence, then, we can reasonably situate the emergence of narrative between 30,000 and 100,000 years before the present.

One of the most striking qualities of storytelling is its transactional nature: it has been described as a “social action” that necessarily requires a teller and an audience (Bauman, 1986, p. 3; Leitch, 1986). Indeed, several researchers have observed that humans enjoy exchanging stories (Kintsch, 1980; see also Michotte, 1963; Sarbin, 1986). The fact that, cross-culturally, humans regularly engage in this pleasurable activity suggests that, like social exchange (Cosmides & Tooby, 1992), this activity confers a fitness benefit upon both parties. I have argued elsewhere that storytellers use narrative to manipulate an audience’s representations of the social and physical environment to serve their own fitness ends (Scalise Sugiyama, 1996). This finding is consistent with studies indicating that social manipulation and deception are an integral part of life among the higher primates and therefore highly likely to have been a recurrent feature of the human evolutionary environment (Byrne & Whiten, 1988; Dunbar, 1996; Whiten & Byrne, 1997). This leaves the question of what the audience gains by listening to a story. My subsequent research indicates that social manipulation is merely one facet of a broader selection pressure to which narrative is an effective solution: information acquisition. Narrative may function as a virtual reality, enabling humans to acquire knowledge useful to the pursuit of fitness without undertaking
the risks and costs of first-hand experience. As Benjamin (1969, p. 87) observes, “The storyteller takes what he tells from experience — his own or that reported by others. And he in turn makes it the experience of those who are listening to his tale.” On this point, several anthropologists have observed that storytelling tends to be the province of older, more knowledgeable and experienced group members. Biesele (1993, pp. 19–20), for example, observes that “it is the combination of the general verbal ability perfected over a long life with the details of the early times usually known only to the old which produces a successful Ju’hoan storyteller. It is knowledge, not secret knowledge, but a large collection of items which are public but take a long time to accumulate, which makes for good storytelling” (see also Wilbert, 1975, p. 8).

Narrative may thus be characterized as a simulation of experience — a set of representations of the human physical, social, and mental environment — from which conclusions about the real world may be drawn. The interactions of story characters, for example, can be seen as models of the human social environment that enable an individual to observe local consequences of a wide variety of actions (e.g., incest, marital infidelity, homicide). These models can be used both to acquire information and to refine knowledge before putting it into actual practice. Humphrey’s discussion of the function of play and dreaming illustrates the adaptive advantage of such psychological simulation:

The ability to do psychology is a biologically adaptive trait in human beings: in the course of evolution the best psychologists have proved to be the best survivors. We can now add another premise: the best psychologists are likely to have been those with the widest range of personal experience. A striking conclusion follows. If psychology means survival and experience means psychology, then experience means survival. So the extension of inner experience should itself be a biologically adaptive trait in human beings. (Humphrey, 1983, p. 69)

Although Humphrey (1983, p. 71) only refers to play and dreaming in his discussion of “biologically based mechanisms for extending personal experience,” clearly narrative offers the same opportunity.

It is important to note that both fictional and nonfictional representations (or representations containing a mixture of each) may serve as models of experience. For example, tales of the supernatural (e.g., thunder god, volcano goddess) are often attempts to explain potentially dangerous natural phenomena and hence may contain information useful to subsistence and/or survival: a myth that contains imaginary creatures and impossible actions may nevertheless contain accurate geographical, botanical, or psychological information. For example, story characters may be fictional — even improbable — beings, but so long as they exhibit human psyches, their interactions can be used as models of the human social environment, enabling an individual to observe the consequences of a wide variety of actions (e.g., incest, marital infidelity, homicide). Similarly, animal characters may talk, metamorphose, or perform other unnatural acts, but information about where, when, and how to find, kill, and process them may correspond to real-world practice. Obviously, the application of quasi-fictional representations to real-world problems requires that the mind be able to distinguish factual from nonfactual information. Models of this process, increasingly known as decoupled cognition, have been developed by Cosmides and Tooby (2000) and Leslie (1987).
Given that stories by definition contain characters (Black & Bower, 1980; Kermode, 1981; Kintsch & van Dijk, 1978; Labov & Waletzky, 1967; Lehnert, 1981; Mandler, 1984; Mandler & Johnson, 1977; Rumelhart, 1975; Schank, 1975; Thorndyke, 1977) — virtually all of whom behave as if they possess human psyches — the proposition that narrative serves as a vehicle for amplifying psychological knowledge is not particularly controversial. However, the extension of personal experience is useful not only in the social domain but in the foraging domain as well. Thus, if narrative indeed functions as a means of acquiring fitness-related knowledge, one would expect the oral literature of foraging peoples to contain not only social information but subsistence information as well. In the remainder of this essay, then, I will (1) discuss information exchange as a possible selection pressure leading to the emergence of narrative; (2) review evidence that foraging peoples exchange subsistence information, in part, through narrative; and (3) demonstrate how key design features of storytelling (e.g., setting, description, mimicry, anthropomorphism) lend themselves to the acquisition of subsistence information.

Before addressing these issues, however, I would like to note that I am using the terms “narrative” and “storytelling” interchangeably in this discussion to refer to the human cognitive ability to tell (and by implication create and process) stories. I characterize narrative as a form of discourse or “oral performance” (Turner, 1985, p. 7; see also Deese, 1983; Thorndyke, 1977) — that is, as a fundamentally verbal medium. Prior to the emergence of language, humans may have processed experience in nonnarrative form (as, presumably, do other species), or, as a number of people have suggested (e.g., Lloyd, 1989; Storey, 1996; Turner, 1996), they might have processed experience as “stories.” Regardless of any protonarrative abilities humans may have had in their preverbal past, however, they could not have used stories as a means of exchanging information prior to the emergence of language. It is this phenomenon — the telling of stories — that I seek to understand.

2. Information acquisition as selection pressure

Ignorance and error are part of everyday life. They are as much a part of the context of human behavior as the distribution of resources or kinship. (Moore, 1981, p. 217)

What social or environmental factors might have triggered the emergence of storytelling? The answer to this question, I believe, is the costs involved in first-hand information acquisition. Although the mind contains strategies designed to solve problems that occur across all habitats and cultures (e.g., mate selection, kin recognition, predator avoidance), many of these strategies require input from the local environment to be fully operational. For example, all humans are faced with the task of locating healthy, nourishing food, and the mind and body appear to contain strategies for accomplishing this. Hunger is the most obvious, of course, but there are others, such as disgust (Rozin & Fallon, 1987; Rozin et al. 1986; 1990) and other food aversions (e.g., to rocks, sticks, feces, vomit, mucus, decayed fruit/meat), as well as the suite of emotions requisite to attacking and killing an animal. Our species occupies a wide array of habitats, however, and items that are edible — not to mention the methods for extracting and processing them — vary across those habitats.
Species-typical algorithms cannot specify what is good to eat in particular locations; this information must therefore be gleaned from the environment itself.

Information gathering is thus essential to human survival. There are a number of constraints on this task, however. Acquiring information first-hand can be costly, inefficient, and downright risky. Trial-and-error learning often requires a substantial investment of time and energy — limited resources that might be better spent on other fitness-enhancing activities. Moreover, it is extremely improbable that a single individual could acquire through experience all information necessary or potentially useful to the multitude of fitness-related tasks encountered over a lifetime. Finally, acquiring knowledge at first hand is risky — a fact of which at least one hunter–gatherer group is keenly aware: when !Kung men were asked whether baby lions’ eyes were open at birth, the reply was, “If you go over there and look, won’t you be dead?” (Blurton Jones & Konner, 1976, p. 329).

As this last example suggests, one important domain of fitness-related information is animal knowledge, which is crucial to both hunting success and predator avoidance. One way to acquire this knowledge is to spend large amounts of time observing animals. Among hunter–gatherer peoples, however, encounters with animals are relatively infrequent: men do not tend to hunt every day, women tend to gather rather than hunt, and children tend to stay near their mothers or camp (Chagnon, 1997; Kelly, 1995; Shostak, 1981). Moreover, most animals do not want to be seen, and many animal encounters are potentially dangerous.

One way around these constraints is to take advantage of others’ experience and acquire information at second hand. In fact, the pooling of information is essential to the pursuit of migratory, widely dispersed resources — which, given that hominids have been hunters and gatherers for 99% of their existence (Lee & DeVore, 1967), is a problem that would have confronted our ancestors as soon as they began making their living on the savanna (Kurland & Beckerman, 1985, p. 73). Although they inhabit a very different biome, caribou illustrate this point well: their migration routes vary to a sufficient degree that a given settlement might not be able to locate a herd in time to kill enough animals to last until the next migration. The Chipewyan people solved this problem in the following manner:

Regional and local bands were located central to possible resource points of migrating caribou or aggregations of subherds…. Information about size and location of caribou was furnished to the larger groups by the smallest exploitative unit, the hunting group. Hunting groups were dispersed from local and regional bands in search of caribou…

The dispersal of hunting groups from the local and regional bands was crucial to the exploitation of the nomadic, often unpredictable caribou. These groups kept track of the caribou movements before seasonal migrations. Hunting groups provided a communications network that kept all members of the bands apprised of caribou movements when the animals were at maximum dispersal. As the animals aggregated for their seasonal migration, the general direction of movement was noted by hunting groups, the information was shared, and the larger regional bands were able to come together in an area that anticipated the migration route. (Heffley, 1981, p. 138)

Clearly, then, there are circumstances that favor second-hand rather than first-hand information acquisition, and information exchange — or the lack of it — is likely to have had fitness consequences for our ancestors. Indeed, some foraging theorists suggest that conspecifics are

In support of this suggestion, quantitative studies of cultural transmission indicate that humans learn many of their survival skills from their fellows (e.g., Ohmagari & Berkes, 1997). Hewlett and Cavalli-Sforza (1986), for example, selected 50 Aka skills (divided into the categories of net hunting, other hunting, food gathering, food preparation, maintenance, infant care, mating, sharing, special skills, and dancing and singing) and asked each person in the study population (N = 72) how they had acquired the skill. The average percentage of individuals reporting that they were self-taught was a remarkably low 0.9% (p. 929). For net hunting, the percentage of self-taught individuals was 0.9%, for all other hunting it was 2.4%. The highest percentage of self-taught individuals was in the category of mating, at 3.7%. Evidence suggests that, like skills, fitness-related information is commonly acquired from others. Perhaps the most familiar example of this is the universal human practice of gossip (Barkow, 1992; Brown, 1991; Dunbar, 1996; Gluckman, 1963), which may be defined as the collection, dissemination, and manufacture of social information. Subsistence information is exchanged as well: adult males are known to amplify their hunting knowledge not only by watching other males but by sharing information and listening to others recount their experiences (e.g., Bieseles, 1978, p. 940; Laughlin, 1968, p. 308; Leacock, 1954, p. 14; Nelson, 1969, p. 374).

On this point, a number of anthropologists and archaeologists have suggested that universal, patterned cultural phenomena (e.g., ritual, art, narrative) may be conceptualized as means of exchanging information relevant to the pursuit of fitness in local habitats (see especially Tooby & DeVore, 1987, p. 210; see also Boyd & Richerson, 1985; Clarke, 1968; Hamburg, 1967, p. 423; Heffley, 1981; Kurland & Beckerman, 1985; Moore, 1981; Quiatt & Itani, 1994). The florescence of art in Upper Paleolithic Europe, for example, has been explained as a response to sweeping climatic change: specifically, these artifacts are believed to have been used to exchange information requisite to the implementation of novel hunting strategies necessitated by changes in faunal dispersal patterns (Conkey, 1978; Gamble, 1980, 1983; Jochim, 1983; Madden, 1983; Mithen, 1990). Several panhuman cultural phenomena have been examined in terms of their evolved design and/or their informational qualities: stylistic variation (Boyd & Richerson, 1987; Conkey, 1978; Gamble, 1983; Scalise Sugiyama, 1998), ritual and “mythmaking” (d’Aquili & Laughlin, 1979), folklore archetypes (Fox, 1995), art (Coe, 1992; Dissanayake, 1992, 2000), and language (Pinker, 1995; Sperber & Wilson, 1986). To date, however, little consideration has been given to the possibility that narrative is an evolved response to specific information-processing problems.

3. Narrative design and content as clues to narrative function

Among the distinctive characteristics of art the universality of its subject matter is perhaps the most decisive. (Armheim, 1988, p. 65)

In his study of the evolution of language, Pinker (1995) argues that one of the most informative resources is language itself. Folklore, too, may be studied as a psychological
artifact: both its design features and content may reveal clues to its function. Tellingly, the salient features of storytelling offer a fairly reliable solution to the constraints on information acquisition. Firstly, because narrative processing requires no physical exertion, it involves minimal energy expenditures. Secondly, because narrative compresses time (through ellipsis), the audience gets more information for its investment — in terms of time and energy spent — than it would through direct experience. Thirdly, because narrative is a representation of experience, its participants need not undertake the physical and social risks of firsthand experience.

Storytelling also solves several constraints on information storage, one of which is the finite nature of experience. It is virtually impossible for one individual to accumulate through personal experience all knowledge potentially useful to survival and reproduction. As Mithen (1990) points out, information exchange efficiently surmounts this obstacle, vastly expanding the effective knowledge base and memory capacity of the individual:

The collective memory of twenty to thirty adults in a band is much richer in retrievable knowledge than that of two or three adults. Among the G/wi, and probably other groups, the mention of a single item leads to a chain of discussion. Sufficient information may be stored within the minds of a group which, when used with newly acquired information, may enable the forager to cope with the normal range of environmental fluctuations and the foraging problems they pose. (p. 75)

Storytelling may also solve the problem of information deficits caused by environmental fluctuations that occur at intervals longer than the average human lifespan, in which case a group may lack individuals with the firsthand knowledge necessary to survive them. The transmission of stories and rituals from generation to generation may provide a means of storing this information (Mithen, 1990, p. 75). Mithen cites Goodale’s (1971) description of Tiwi initiation rites to illustrate how this might work:

In one of these [rites] the initiates are meticulously taught how to prepare yams in a ceremony which has remained remarkably stable in its particular sequence of events. The specific variety of yam is not normally eaten by the Tiwi and is poisonous in its unprepared state. The important point that Goodale makes is that this yam, and a toxic cycad the preparation of which is also taught in a ceremony, are used as emergency foods in times of famine. The infrequency of famine and the lack of its normal exploitation (owing to its bitter taste) may prevent human memory acting as a adequate information storage device concerning its preparation. Consequently we find this stored in ritual. (Mithen, 1990, p. 75)

Another salient feature of stories is that they are strikingly memorable. Sperber (1985) notes that although the story “Little Red Riding Hood” is much more complex than a 20-digit number, the story is much easier to remember. We can say with relative certainty that the processing of 20-digit numbers was not requisite to survival in the environment of evolutionary adaptiveness. This observation raises an intriguing question: If we do not remember 20-digit numbers well because it was not advantageous for our ancestors to do so, do we remember stories well because it was advantageous for our ancestors to do so?

Finally, more than any other ancient cultural practice (e.g., oratory, visual art, the plastic arts, dance, music), narrative appears well-designed for comprehensive simulation of the
human habitat — that is, for the creation of a “diegetic world” (Leitch, 1986, p. 4) made up of the salient constraints on human fitness: people, events and phenomena, time, topography, and the animate and inanimate objects that occupy it. Furthermore, unlike other art forms, narrative is highly goal-oriented. Indeed, Black and Bower (1980) argue that the essence of “storiness” is the description of problems and of characters’ plans for solving problems (see also Kermode, 1981; Mandler, 1984, pp. 50–53; Mandler & Johnson, 1977). Narrative can thus be seen as a means of simulating certain fitness goals and obstacles and providing local information necessary to pursue and/or surmount them. On this point, it is noteworthy that narrative may readily be tailored to meet the specific information needs of local habitats — a point that the stories of the Dreamtime illustrate nicely:

By Western dramatic standards, these myths lack excitement and tension, dwelling as they do much of the time on the naming of places and the movements of ancestral beings from one spot to the next. Yet because many tell of journeys covering hundreds of miles of desert, through areas that Mardudjara in many cases have not seen, they broaden the cosmological and geographical outlook of the Aborigines and give them a feeling that they know those areas. (Tonkinson, 1978, p. 89)

If narrative is indeed an information exchange system designed to amplify experience, one would expect the oral tradition to comprise domains of information that, throughout human evolution, have been relevant to survival and/or reproduction. This indeed appears to be the case. Folklore motif indexes (used by folklorists to classify folk tales by their plot contents) employ classification categories that consistently correspond to adaptively relevant domains of information: social relations (e.g., kinship, marriage, sex, social status, morality, interpersonal conflict, deception), animal behavior and characteristics, plants, geography, weather, and the cosmos (see, e.g., Aarne, 1961; El-Shamy, 1995; Thompson, 1957; Waterman, 1987). The folklore of foraging peoples exhibits a similar pattern (Turnbull, 1965; Wilbert, 1975; Wilbert & Simoneau, 1990). The tales of Ju’hoansi foragers, for example, “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” (Biesele, 1993, p. 13; see also Fock, 1982, p. 17). Common Ju’hoansi folklore themes include “problems of marriage and sex, the food quest, sharing, family relationships, the division of labour, birth and death, murder, blood-vengeance, and the creation of the present world order” (Biesele, 1993, p. 17), as well as “the origin of meat animals... and the balance of power between men and women” (Biesele, 1993, p. 23). Biesele (1978, p. 923) also reports that a key metaphor in !Kung oral literature, !kxwoi !go, refers to “a constellation of ideas relating to avoidance of carnivore attack.” This correspondence between fitness problems consistently faced by our hunter–gatherer ancestors and the recurrent themes of world folklore has been noted by evolutionary social scientists:

The ubiquity of Cinderella stories (e.g., Cox, 1893) is surely a reflection of certain basic, recurring tensions in human society. Women must often have been forsaken with dependent children throughout human history, and both fathers and mothers were often prematurely widowed. If the survivor wished to forge a new marital career, then the fate of the children became problematic. (Daly & Wilson, 1988, p. 85)
In a similar fashion, trickster tales reflect the problem of cheaters: as Biese (1993, p. 23) notes, “Absurd as the contents of these [Jj/’hoan trickster] tales may seem, it is nevertheless clear that they explore... some of the fundamental issues of social living.” This correspondence has prompted at least one anthropologist to suggest that “those enduring themes and characters that Jung and the folklorists have so diligently described and classified” might be re-defined as “domain-specific information-processing myth modules” (Fox, 1995, pp. 135–136).

The ethnographic record accords with the folklore record, providing evidence that foragers use narrative as a means of acquiring and storing fitness-related information. For example, in a series of “seminars” at which small groups of !Kung men were asked to discuss animal behavior, Blurton Jones and Konner (1976, p. 338, italics added) found that the !Kung often “would begin to discuss some point among themselves and recount observations to each other... A strange feature of these discussions was that the participants seemed to gain a lot of new information, or at least heard about observations and generalizations concerning [animal] behavior which were quite new to them.” Finding little direct transmission of information between !Kung men, Blurton Jones and Konner (p. 344, italics added) concluded that “Perhaps verbal transmission of information is indirect, through people telling the story of their day’s excursion as opposed to direct lecturing.” Similarly, Goodwin (1939) observes that, in White Mountain Apache tales, “one cannot help noticing that wild food plants and the gathering and preparation of them are frequently mentioned” (p. xi). He adds that “Much information concerning the economic life, material culture, society and religion is to be found in [Apache] tales. And it is important to note the tales besides incorporating such information, are used by the Apache themselves to convey knowledge” (p. x).

When trying to understand why humans do what they do, it is often worth noting what they do not do. A striking feature of foraging information is that it does not tend to be stored or transmitted in the form of lists or lectures. Rather, it appears that this information “is often maintained within the context of particular episodes and events of the past rather than being abstracted from that context” (Mithen, 1990, p. 74). One of the most striking differences between narrative on the one hand and lists and lectures on the other is that, through its use of such devices as description, imitation, anthropomorphism, and setting, narrative provides a highly effective means of simulating the environment in which our ancestors struggled to survive. As a result, the story world and the real world correspond in several consistent and predictable ways, and individuals are thus able to apply narrative information to tasks associated with subsistence and reproduction in their local environment.

This is not to say that lists are never employed in oral narrative. Biese (1993) mentions the enjoyment the Ju/’hoansi get out of reciting a “litany” of game animal names. This list, however, is often recited as part of a story, such as the origin story of “The Branding of the Animals” or the story of a hunting trip (pp. 88–89). Examples from nonforaging societies include the list of who beget whom in the book of Genesis and the catalogue of ships in the Iliad, both of which are also contained within stories. Significantly, memory research shows that the closer a word list approximates prose, the better subjects recall the list (Miller & Selfridge, 1950; Tulving & Patkau, 1962).
Mithen’s (1990) reconstruction of Pleistocene cognition neatly complements these observations by indirectly suggesting several ways in which narrative may be used to acquire, store, and transmit useful foraging information. He argues that “rituals which involve the mimicry of an animal which is to be hunted... may have a role in recalling information about that species and increasing the receptivity of the forager to signs of that animal when foraging” (p. 79). The telling of animal tales, which often involves imitation and/or detailed description of the animal(s) featured in the story, may serve a similar function, reacquainting the experienced and familiarizing the uninitiated with an animal’s important habits and characteristics. On this point, the “seminars” conducted by Blurton-Jones and Konner (1976) among the !Kung are particularly revealing. At times, these discussions took the form of narrative, featuring “lengthy, detailed, and very gripping... descriptions of what they had seen” (p. 330), which many of the participants relished. One man, for example, described how a leopard kills its prey:

the leopard sees the animal and, semiconcealed, crawls slowly toward it until it is lying down four to five yards away; then it springs and grabs the prey at the throat — its arms over the victim’s shoulders and legs around its waist. Then winding its tail around the back legs of the animal (they say the leopard’s tail is very strong), the leopard bites the prey in the throat. (p. 330)

Significantly, imitations form a large part of these descriptions, and are accurate in sound and very convincing (Blurton Jones & Konner, 1976, p. 330). One of the seminar participants “imitated the sound of kudu fighting and described this as something to listen for when stalking them for a kill,” a strategy whose effectiveness was corroborated by another !Kung, who “described how he came across two [kudu] males with their horns interlocked, pushing at each other, and then added that he shot them, they separated and died” (Blurton Jones & Konner, 1976, p. 330). Yanomamö storytellers, too, make frequent use of mimicry in their narratives (Wilbert & Simongneau, 1990).

Even tales that are not overtly descriptive or imitative may convey useful animal information. Mithen (1990) argues that many Upper Paleolithic cave paintings and bone carvings can be seen as representations of environmental cues foragers utilize to locate and track prey. In a similar fashion, etiological tales may call attention to an animal’s important physical or behavioral characteristics. For example, a Yanomamö story that describes “How the Monkeys Got Their Colors” provides information useful in identifying four different species:

Being cold, Howler Monkey rubbed himself all over with annatto and then he climbed into the trees. Spider Monkey was also cold. He crushed charcoal and then rubbed himself all over. He painted himself all black and then he too climbed up into the trees. The capuchin monkey did the same, painting himself all black and climbing into the trees. White Monkey rubbed himself with wood ash all over and so he too climbed up into the trees. (Wilbert & Simongneau, 1990, p. 177)

Etiological tales may also provide behavioral information. For example, the story of the serpent in Genesis — based in part on a folk explanation of the antipathy between snakes and humans (Sandmel, 1976) — characterizes snakes as harmful creatures. Because of their size and shape, their ability to move in virtual silence, and their ability to strike with lightning
speed, snakes are extremely difficult to detect until it is too late. The story’s portrayal of the serpent as crafty and dangerous thus conveys a highly useful message: watch out for snakes because they are hard to spot and potentially lethal. In an interesting variation on this theme, the Dreamtime story, “Why the Black Snake Hides,” tells of a highly venomous and plentiful snake that is nevertheless little feared because of its reclusive nature (Ellis, 1994).

Anthropomorphism may be used for similar ends: according to Mithen (1990, p. 77), there is evidence that attributing human characteristics to animals leads to highly accurate predictions of their behavior. Because it uses a preexisting set of behavioral terminology (i.e., terms applied to humans), he argues, anthropomorphism decreases the amount of information a forager must store and thus “prevents overload of mental capacities, releasing these for other tasks” (Mithen, 1990, p. 77). It certainly appears to be the case that, as Mithen reports, anthropomorphism is practiced by a wide range of modern hunter–gatherer societies in a wide variety of environments. Bieseke (1993, p. 21), for example, reports of Ju/’hoansi folklore that, “All stories with animals... have them acting much like human beings, though they also already possess traits that will characterize them when they become animals.” I have found the same to be true of the Crow (Lowie, 1922), Selknam (Wilbert, 1975), White Mountain Apache (Goodwin, 1939), Tehuelche (Wilbert & Simoneau, 1984), and Yanomamö (Wilbert & Simoneau, 1990). And these stories can indeed provide useful behavioral information. In a Tehuelche tale about “The Fox and the Indians,” for example, fox, who is characterized as being “the smartest of them all” (Wilbert & Simoneau, 1984, p. 130), nearly succeeds in stealing two rhea eggs by rolling them in front of him.

I have also found, however, that the human characteristics attributed to animals are often too general to be of much use in anticipating specific behaviors. For example, in another Tehuelche tale about “The Rock and the Fox” (Wilbert & Simoneau, 1984, p. 127), the fox, who in this case is characterized as being mischievous and proud, mocks a stone by challenging him to a downhill race. Although it is certainly worth knowing that foxes are clever, knowing that they are proud is of questionable use (and veracity), and neither piece of information sheds light on how a fox might behave in a given situation. Moreover, the actions committed by animal characters are often human actions: the fox’s challenge of the rock, for example, is the act of a human being. Thus, because the story does not present information about the kind of mischief foxes get into, its characterization of the fox as mischievous does not enable the prediction of fox behavior.

An alternative to Mithen’s hypothesis is that anthropomorphism is used to communicate both animal and human behavioral information. This can be seen in yet another Tehuelche story (Wilbert & Simoneau, 1984, p. 128), in which fox and armadillo each rope a mare to see who is the strongest. Armadillo wins the contest by pulling a mare into his cave which, because it has many twists and turns, causes the mare to become tangled and hang herself.

The information presented in this story regarding armadillo burrows is accurate and useful in predicting a specific behavior: armadillos do indeed dig burrows with many winding passages. The mare-roping contest, however, only makes sense if we think of these characters as human actors. Neither foxes nor armadillos hunt horses, nor do they challenge each other to contests of strength. This aspect of the story, then, simulates human rather than fox or armadillo nature — specifically, human male intrasexual competition and the human female tendency to desire strength, dexterity, bravery, and striving in a mate.
The interspecies interactions in these tales point to yet another way in which narrative may be used to convey subsistence information. Mithen and others (e.g., Laughlin, 1968) have noted that the presence of one species often signals the presence of another, and it is well known that foragers use this information to locate game. Animal tales often involve interactions between species, and may thus convey information about useful interspecies associations. A striking example of this is a Yanomamö tale in which the antshrike (Cymbilaimus lineatus) mourns for his father-in-law the tapir (Tapirus terrestris) by crying “Shoabe!” (“Father-in-law!”), a cry which the Yanomamö claim is the “announcing song” of tapirs. In the story, Antshrike searches for tapir by following his trail: “The trail followed a river upstream, meandering along, went past a hill, skirted it, then turned back. That was how Antshrike taught us how to follow the trail of a tapir” (Wilbert & Simoneau, 1990, p. 307). In fact, the two species both inhabit the tangled Amazon undergrowth (Wilbert & Simoneau, 1990, p. 356), and tapirs are known for their extremely circuitous trails (Wilbert & Simoneau, 1990, p. 355).

As this last example indicates, a story’s setting may provide information regarding animal habitats. Setting may also be used to convey information about the lay of the land, knowledge invaluable for undertaking long hunting forays. In one Yanomamö tale, for example, Ocelot is out hunting when he hears the spirits of the night say, “The river Kokoi u flows far downstream! Bei ya shii! Bei ya shii! Bei ya shii! The river Yanae u has its source upstream! Bei ya shii! Bei ya shii! Bei ya shii! The river Bami u has its sources farther upstream! Bei ya shii! Bei ya shii! Bei ya shii! The river Ukushibi u flows in the center!” (Wilbert & Simoneau, 1990, p. 172). In the space of a few lines, this story informs the listener of the relative positions of four rivers.

In sum, much seemingly incidental description of characteristics, behavior, and setting actually provides useful information regarding where and when a given resource can be found, how it can be obtained, and/or the uses to which it can be put. One Yanomamö tale, for example, features a man in the form of a Silver-Beaked Tanager picking rashasike palm fruits, simultaneously providing information about the bird’s habitat and diet (Wilbert & Simoneau, 1990, pp. 194–197). In a Crow tale, Old-Man-Coyote tells all the animals where to live and what to eat, while the narrator indicates what Old-Man-Coyote will do with them after he kills them:

He told the deer to go to the woods and thickets and to eat rose berries, later he would eat them. He told another kind of deer to eat sagebrush and grass and live in the hills; he would eat them... He took the beaver and told him to go to the river, to live and make his house there, to eat willows and cottonwoods, and after awhile Old-Man-Coyote would use their testes for perfume. He told the otter to go to the river and live there, after a while he would kill him and use his blanket. (Lowe, 1922, pp. 26–27)

In the same tale, Old-Man-Coyote tells the prairie chicken to “stay here all year and dance in the spring” (p. 27), providing information regarding the animal’s seasonal behavior and residence patterns. Some stories, such as the Crow tale in which Old-Man-Coyote tricks a herd of buffalo into running off a cliff (after which he kills and eats one of the injured animals), describe hunting strategies (Lowe, 1922, p. 19). Others describe foraging strategies, such as the Crow story that tells where to find wild strawberries (Lowe, 1922,
pp. 29–30), or the Yanomamó story that tells where different kinds of honey can be found: “The oi honey clung to the top of the tall trees; the rebome honey fled into the earth; the yoi honey hid in the hollow branches” (Wilbert & Simoneau, 1990, p. 205). Stories may also provide information regarding indicators of edibility or ripeness. One Crow story, for example, tells when cherries are ripe (Lowie, 1922, pp. 29–30), and a Yanomamó tale relates how to tell the difference between rasha fruits and manaka fruits: “After gathering a few clusters Tanager took a bite of one of the fruits and called down to his wife: ’They’re only manaka fruits! They’ve got no pulp; they’re bitter!’ . . . He knew that rasha fruits were different: ‘Real rasha fruits aren’t like that! The palms on which they grow have spiny trunks!’” (Wilbert & Simoneau, 1990, p. 194). Stories may also contain information regarding the acquisition and processing of raw materials: one Crow story, for example, describes what materials to use for making bows and arrows, what to kill buffalo with, and how to tan buffalo hide (Lowie, 1922, pp. 29–30).

4. Discussion

The ability to construct and manipulate valid models of reality provides humans with our distinctive adaptive advantage. (Bower & Morrow, 1990, p. 48)

Despite Tooby and DeVore’s (1987, pp. 207–208) seminal observation that two of the most salient differences between humans and other species are our highly elaborated abilities to (1) make, deploy, and communicate cognitive models of our environment; and (2) create, maintain, and transmit information, evolutionary psychology has underestimated the importance of the arts in human evolution. Researchers have been slow to appreciate these highly patterned, cross-cultural behaviors as stratagems for generating and transmitting information-rich models; many appear content, like Pinker (1997), to dismiss art, music, humor, fiction, and similar behaviors as by-products of other evolved capacities; only a handful are seriously exploring the possible adaptive significance of these behaviors (e.g., Coe, 1992, forthcoming; Constable, 1997; Cosmides & Tooby, 2000; Dissanayake, 1992, 2000; Dunbar, Knight, & Power, 1999; Miller, 1997, 1998, 2000). This latter group is defined by two general research trends: one that envisions art behaviors as courtship display and another that entertains the possibility that they serve other adaptive functions. The former approach explains these behaviors in terms of sexual selection, the latter in terms of natural selection. It increasingly appears that art behavior cannot be fully understood without recourse to both approaches.

Miller’s ingenious merger of costly signaling, indicator, and sexual selection theory may ultimately go a long way toward explaining many facets of art behavior, but it does not appear to explain everything. For example, if creative behaviors functioned solely as courtship displays, we would expect them to be consistently directed at members of the opposite sex of reproductive age. In some foraging cultures, however, certain songs or stories are performed only in same-sex groups (Goodwin, 1939; Wilbert, 1975); in others, they are commonly told to mixed audiences, both male and female, sexually mature and immature; in yet others they are told predominantly by postreproductive individuals
(Bieseles, 1993). Miller would likely counter this objection with his argument that art behavior by nonreproductive individuals can be seen as vicarious courtship display: the fitness of a given individual can be assessed, in part, by assessing the fitness of his or her close kin; thus, we might expect individuals to advertise their fitness (via art displays) in order to increase the attractiveness of their kin. The logic of this argument, however, requires us to believe that children listen to stories — even stories told by their immediate kin — in order to make fitness judgments about potential mates. All of which raises the question, What specific attribute(s) is(are) being displayed through storytelling? While oral narrative (along with other art forms) appears to be a serviceable enough vehicle for displaying “cognition indicators, which reveal mental capacities for perception, attention, memory, planning, and creativity” (Miller, 1998, p. 115), what oral narrative appears to be uniquely well-designed for is conveying life experience. Storytellers make us laugh, cry, and scream by creating believable characters and scenarios; what storytelling displays par excellence, then, is the ability to manipulate others through verbal deployment of information. But why would such an ability be a reliable cue of fitness if it did not in itself enhance fitness? We are left, then, with the chicken-and-egg problem of determining which came first: selection for costly signaling or selection for verbal manipulation? It seems more plausible that storytelling was selected as a means of disseminating information — with the opportunities for education, deception, and manipulation that such simulation affords — after which storytelling skill became a reliable cue of verbal and protean intelligence.

In support of the runaway sexual selection model of art behavior, Miller (2000, p. 275) notes that “sexually mature males have produced almost all of the publicly displayed art throughout human history.” As he himself admits, however, the historical record is a problematic data source because, in most agricultural and industrialized societies, women’s activities have been largely controlled by men (pp. 81–85). As a result, it is impossible to determine whether women in these societies produced less art than men because they did not want to or because they were not allowed to. Moreover, as noted above, art behaviors emerged not during the relatively brief industrial or agricultural phase of our species’ history but, rather, during its long hunter–gatherer phase; art production trends in Western industrialized societies may thus be unreliable indicators of ancestral art production patterns. In their hunting-and-gathering past, for example, women may have had relatively more autonomy and may have produced just as much publicly displayed art (i.e., body ornamentation, pottery, basketry, textiles) as men did. The ethnographic record certainly shows that women in hunter–horticulturalist societies frequently ornament their practical creations (Chagnon, 1997; DeBoer, 1990; Gusinde, 1937; Sugiyama, personal communication). If we wish to understand the function of art behaviors, then, we must examine them as they are manifest and utilized in hunter–horticulturalist cultures, with an eye to the selection pressures to which they may be a response (see, e.g., Coe, forthcoming).

A number of tried and true methodologies would readily lend themselves to this task. For example, time-allocation studies conducted among hunter–horticulturalist groups could be used to investigate how much time is devoted to storytelling, who tells the most stories, patterns in audience composition, time of day/year that most storytelling takes place, and circumstances that trigger storytelling. The runaway sexual selection account of art behavior
would predict a statistically significant difference in the amount of time each sex devotes to art activity; the information exchange account would predict no significant difference. Additionally, as a number of studies (Hewlett & Cavalli-Sforza, 1986; Ohmagari & Berkes, 1997) have demonstrated, interviews can be used effectively to determine where and how individuals in foraging societies acquire various kinds of fitness-related skills and information. A further avenue of inquiry is quantitative analysis of hunter–horticulturalist narrative content, which can illuminate both the amounts and types of information that are transmitted via narrative. Finally, reverse-engineering narrative and similar behaviors (Cosmides & Tooby, 2000) may shed more light on their cognitive design and function than the current tendency to characterize them as sundry permutations of a single phenomenon [e.g., “making special” (Dissanayake, 1992) or “courtship display” (Miller, 2000)]. Taken collectively, these approaches can be used to situate narrative in its evolutionary milieu by identifying the kinds of information hunter–horticulturalist folklore is used to communicate, developing a cross-cultural age–sex profile of hunter–horticulturalist storytellers and audiences, and delineating the cognitive mechanisms that distinguish narrative processing from other forms of art production. Until we do this, we cannot be certain what selection pressures caused our ancestors to acquire the ability and desire to craft verbal virtual realities and share them with one another around the campfire.

References


