
Is There a Role for Culture in Human Behavioral Ecology?

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Most research in human behavioral ecology has been acultural, which raises the question of how best to incorporate the concept of culture into this approach. A necessary step in this direction is to pare the culture concept down to its ideational elements, excluding behavior and its material products (Durham 1991; Geertz 1973; Keesing 1974). The cultural and reproductive success hypothesis, though empirically successful (Irons 1993), is not a model for all of culture because of widespread discrepancies between behavior and culture to which it does not call attention. Cultural transmission models are also weakened by such discrepancies, but, more importantly, such models are most relevant to phenomena different from those central to human behavioral ecology. A better way to incorporate culture into human behavioral ecology is to see it as the context of human action and as a tool people use in social manipulation. The study of signal systems is a key to an understanding of social manipulation and to the incorporation of culture into human behavioral ecology. Examples of the manipulation of culture for reproductive benefit include Yanomamö kin term manipulation (Chagnon 1988), incest rules (Thornhill 1990, 1991), and the derogation of sexual competitors (Buss and Dedden 1990). The human behavioral ecological study of social manipulation in cultural contexts needs to be expanded. Two phenomena that might shed light on such manipulation are the Rashomon effect and the audience effect.

KEY WORDS: Behavioral ecology; Culture; Cultural transmission; Dual inheritance; Evolutionary culture theory; Communication; Signals; Rashomon effect; Audience effect.

To date, human behavioral ecology has had little room for the concept of culture. This article explores this problem, first by examining some of the ways that have been suggested for how to incorporate culture into the approach, and then by proposing a new way to conceptualize the role of culture in human social life. In this article, I am using the phrase

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“human behavioral ecology” as a label for the evolutionary biological study of human behavior, including evolutionary ecology, evolutionary psychology, human ethology, and human sociobiology.

THE IDEATIONAL DEFINITION OF CULTURE

The concept of culture was introduced to anthropology with E.B. Tylor’s famous, sweeping definition: that “complex whole which includes knowledge, belief, art, morals, custom and any other capabilities and habits acquired by an individual as a member of society” (1871). That definition was followed by many more (see Kroeber and Kluckhohn 1952), but the concept went through its most radical revisions in the late 1960s and early 1970s. A key figure in this movement was Clifford Geertz (1973), who argued that Tylor’s definition had “reached the point where it obscures a good deal more than it reveals.” In a spirit akin to the Popperian notion that a concept that explains everything explains nothing, Keesing (1974) proposed that the time had come to “narrow the concept of ‘culture,’ so that it includes less and reveals more.” The main way this was accomplished was by distilling the ideational elements out of Tylor’s broad notion, separating them from the actual behavior of people and its material products.

Geertz, according to Barkow (1989), donated the concept of culture from the social sciences to the humanities, but Barkow, Durham (1991), and others (e.g., Boyd and Richerson 1985; Laland et al. 1995; Pulliam and Dunford 1980), have since taken it back, using an ideational definition of culture as the basis for scientific approaches to human behavioral variation. Culture is, in this view, “a system of socially transmitted information” (Barkow 1989). An ideational definition of culture is sometimes opposed because it seems to imply that culture is an ethereal, immaterial thing that is somehow not of this physical world, but this is not the case. Rather, culture does take physical form as “mental representations inside brains” (Sperber 1985).

This narrow, limited definition of culture contrasts with some that have been proposed in recent years in the literature on evolution and human behavior. For example, the definition of culture used by Daly and Wilson (1989) explicitly includes not only ideational elements, but also behavior itself. They argue, for example, that “chronic, society-specific levels of violence *are* ‘culture’.” (p. 109). Similarly, Tooby and Cosmides (1991) define culture as “any mental, behavioral, or material commonalities shared across individuals, from those that are shared across the entire species down to the limiting case of those shared only by a dyad, regardless of why these commonalities exist” (p. 117).

From the point of view of an ideational definition of culture, these other definitions confuse manifestations of culture—behavior, especially behavioral commonalities, and its material products—with culture itself. Furthermore, if we include behavior under the heading of culture, we will never be able to use the concept of culture to achieve what Nozick (1974) calls a “fundamental explanation” of behavior. To Nozick, “Fundamental explanations of a realm are explanations of the realm in other terms; they make no use of any of the notions

of the realm. Only via such explanations can we explain and hence understand everything about a realm; the less our explanations use notions constituting what is to be explained, the more (*ceteris paribus*) we understand." If behavior is not distinguished from culture through the use of an ideational definition of culture, any explanation of behavior in terms of culture will be entirely in terms "inside the realm," and therefore will not be a fundamental one, and therefore will not really explain anything.

Tooby and Cosmides (1991) and Cosmides and Tooby (1991) do, helpfully, separate their culture concept into three parts: metaculture, evoked culture, and transmitted (or reconstructed, adopted, or epidemiological) culture. Metaculture refers to "panhuman mental contents and organization" produced by psychological mechanisms "functionally organized to use cross-cultural regularities in the social and nonsocial environment" (Tooby and Cosmides 1991). Evoked culture refers to within-group similarities and between-group differences in behavior produced by exposure of the same evolved psychological mechanisms to varying circumstances (Tooby and Cosmides 1991; Cosmides and Tooby 1991; see also Daly and Wilson 1989 for a very similar point). Transmitted culture refers to the spread of mental representations from one person to another (see also Sperber 1985, 1990). Of these three, only transmitted culture corresponds to the ideational concept of culture. The other two aspects of Tooby and Cosmides' culture concept, metaculture and evoked culture, are extremely important and useful ideas that should be kept and developed, even if their chosen labels for them are discarded.

THE CULTURAL AND REPRODUCTIVE SUCCESS APPROACH

One way to handle the problem of culture within the framework of human behavioral ecology was developed by Irons (1979), who proposed that culture tracks fitness the way evolving organisms track changing environments. More specifically, he predicted that in environments resembling those of human evolution, culturally defined success should correlate with biological success, that is, the enhancement of inclusive fitness, and that as a society's situation changed in ways that change which behaviors lead to enhanced inclusive fitness, so should that society's cultural values change (see Cronk 1989 for an example). The many confirmations of this hypothesis that have since been published (see Irons 1993) have served to justify the wider project of human behavioral ecology (Cronk 1991a).

Even though this hypothesis has everything to do with culture, the empirical support it has received has also somewhat paradoxically helped to justify the way that human behavioral ecologists, including this author, have paid very little attention to culture. In short, the idea is that if culture tracks fitness, that is, if achieving culturally defined goals tends to enhance inclusive fitness because what is culturally defined as success tracks inclusive fitness-enhancing behaviors, then culture is a proximate mechanism for tracking environmental variation and defining what is adaptive in a very simple and direct way. Seen this way, culture can be incorporated into behavioral ecology with very little thought. One can

assume that culture will define what is locally adaptive and that people will do what culture tells them to do. This allows researchers to borrow models from animal behavior studies and to assume that these models will predict behavior and that the details of culture need not be explored. This approach has been very useful, and much literature has in fact confirmed that much of human behavior can be predicted from these models, especially in more traditional societies (Borgerhoff Mulder 1991; Cronk 1991a). However, there are many aspects of culture that clearly do not fit this simple environmental tracking model, and they are ignored by behavioral ecologists.

For example, this approach is unable to account for the frequently documented lack of fit between what people say and what they do. If people are behaving in ways that make sense as ways to enhance inclusive fitness but their cultural statements about such behavior do not match their behavior, what do we do with the idea that culture tracks that which is fitness-enhancing? One rich and fascinating study of discrepancies between culture and behavior is Francesca Cancian's account of the Maya community of Zinacantan in Mexico (Cancian 1975). Focusing on the issue of Westernization, she surveyed people's norms, studied their behavior, and came to the conclusion that there was no fit between the two. Cancian's study built upon a sizable body of previous research in sociology and social psychology on the lack of fit between attitudes and behavior (see Deutscher 1973). LaPiere (1935), for example, conducted a pioneering study of the differences between the attitudes of American hotel and restaurant owners to the prospect of having Chinese customers and their actual behavior toward Chinese travelers who show up in person. The attitudes were overwhelmingly negative, with 92 percent of 81 restaurants and cafes and 91 percent of 47 hotels and camps saying they would refuse service to Chinese, while their actual behavior was quite the opposite. Out of 251 businesses patronized by LaPiere and a Chinese couple, only one refused them service. Warriner (1958) explored discrepancies between public statements about drinking alcoholic beverages and private behavior in a Kansas town.

A few behavioral ecologists have also been concerned with discrepancies between what people say and what they do. For example, I have documented such discrepancies in the area of sex biases in parental investment among the Mukogodo and several other groups (Cronk 1991b, 1991c, 1993). Similarly, Hrdy (1990) has described how, even though a stated preference for sons is deeply culturally entrenched in South Asia, actual treatment of sons and daughters varies according to the specific economic and reproductive situations of individual parents. These cases demonstrate that, as Harpending et al. (1987) have pointed out, cultural traits are unlikely to be exact guides to behavior because behavior can change so much more rapidly than peoples' cultural understanding and expression of such change. Harpending et al. cite the examples of the !Kung, whose behavior reflects a loose and flexible social use of space (Lee 1979) but whose culture encodes an elaborate and rigid system of territories and boundaries, and

of the Mundurucú, who have a patrilineal ideology despite their matrifocal social behavior (Murphy and Murphy 1974).

THE CULTURAL TRANSMISSION APPROACH

Another way to bring the culture concept into human behavioral ecology would be through wider use of cultural transmission (also known as dual inheritance, coevolutionary, or evolutionary culture theory) models. At the core of this approach is an analogy between cultural traits and genes. Both are seen as replicators (Dawkins 1976) that are capable of going through a selection process. This idea is implicit in many discussions of cultural transmission, and it was made explicit by Boyd and Richerson (1985): "Thus by our definition, the relationship between culture and behavior is similar to the relationship between genotype and phenotype in noncultural organisms." In other words, behavior is the outward manifestation of culture in the same sort of way that an organism's phenotype is the outward manifestation of its genotype, or, as it is often phrased, individuals "acquire behavior" through culture. In the works of some other cultural transmission theorists, this idea remains an unstated but important assumption. For example, Lumsden and Wilson (1981) switch from discussions of the evolution and transmission of cultural rules to discussions of behavior that follows the rules, as if culture and behavior are isomorphic (see Durham 1991). Similarly, Boyd and Richerson define culture in informational terms but, when they get down to cases, treat it as if it were simply behavior (Durham 1991). Indeed, Boyd and Richerson's very definition of culture excludes anything that does not influence behavior: "By 'culture' we mean the transmission from one generation to the next . . . of knowledge, values, and other factors that influence behavior" (1985). This runs the risk of treating individuals not as evolved, self-interested organisms, but as passive receptors for culture (Daly 1982; Daly and Wilson 1989; Reynolds 1981).

Like the cultural and reproductive success approach, cultural transmission models are also challenged by the many discrepancies between behavior and culture. If behavior is merely the outward manifestation of culture, then how can so many behaviors fail to follow culture's dictates? Even in circumstances where culture and behavior happen to match, the "culture made them do it" explanation should not be accepted without question because the correspondence may be due simply to chance or to similar expressions of common, evolved human psychological mechanisms, or what Tooby and Cosmides (1991) call "evoked culture." Although there certainly is some causal relationship between culture and behavior, the exact details of that relationship are not at all well understood. The problem of how culture can motivate people to act has recently been the subject of some interesting and pioneering research by a group of psychological anthropologists led by Roy D'Andrade (see D'Andrade and Strauss 1992), who argues that this problem is a fundamental one to all of cultural anthropology:

In current anthropological theory there is no clear relation between *culture* and *action*. Of course, one can say "people do what they do because their culture makes them do it." The problem with this formulation is that it does not explain anything. Do people always do what their culture tells them to? If they do, why do they? If they don't, why don't they? And how does culture make them do it? Unless there is some specification of how culture "makes" people do what they do, no explanation has been given. (D'Andrade 1992).

Strauss (1992) argues that, contrary to what she calls the "fax theory of the relation between public life and private representation," the new research shows, "on the one hand, that motivation depends on cultural messages and is realized in social interaction, but on the other, that motivation is not automatically acquired when cultural messages have been imparted." Harkness et al. (1992) provide an example of the sort of problem being addressed in a study of how Americans learn to be parents given all of the different, often conflicting, often ambiguous, and often changing advice they receive about child rearing. They document how parents get information about parenting and child development from their own past experiences, from watching other people raise children, from informal networks of parents with children of similar ages, and from expert sources such as child-care manuals and selectively choose to follow some examples and advice and avoid others. Although it is not yet possible to offer a general theory of how culture influences behavior, the recognition that this is a problem worthy of detailed study is a good sign. As interesting and promising as this new area of research may be, however, it also seems clear that a great deal more would be learned about how culture influences behavior if it were informed by evolutionary models of behavior, social learning, and cultural transmission because such models could provide some clues and predictions as to what the processes and mechanisms involved should look like.

These problems aside, it is clear that cultural transmission models are relevant to a definite range of phenomena and should be part of a complete view of the human experience. Unlike the cultural and reproductive success approach, they do provide a way of explaining instances in which people behave in ways that are contrary to their fitness interests. However, they do not provide us with an approach to culture that is helpful to the project of human behavioral ecology. The reason for this is simply that the two approaches are concerned with different things. Cultural transmission models are concerned, as the name implies, primarily with the spread (transmission) of cultural traits. The extent to which those traits influence actual behavior is really a secondary issue, and not all cultural transmission models *sensu stricto* need address that issue. It is all right, to some limited extent, for these models to treat cultural traits as similar to genes or viruses (see Cavalli-Sforza and Feldman 1981; Dawkins 1976; Sperber 1985, 1990; Williams 1992) and to ignore, for the time being, the details of the evolved psychology of their bearers. But however valid and useful this might be, it does not do much to elucidate the subject of interest of human behavioral ecology, which is, of course, behavior itself — behavior that takes place in the context of culture. This distinction may be made clearer through an example shared with

me by Peter J. Richerson (personal communication). He pointed out that there are aspects of human social life that take place without any cultural transmission being involved. The example he used was that of a con artist. An encounter between a con artist and his victim does not spread a cultural trait of being a sucker or of being a con artist, and therefore it is not of much interest to the student of cultural transmission. But such an encounter does involve interesting human behaviors and evolved psychological propensities, and is therefore very interesting to human behavioral ecologists. But such an encounter takes a particular form because of the cultural context in which it occurs, so that despite the fact that no significant cultural transmission may be occurring, *culture as the context for the encounter* is still very relevant to a full understanding of it.

CULTURE AS CONTEXT, TOOL, AND WEAPON

Biological Warfare, Mud, and Manipulation

A key element in a human behavioral ecology informed by the concept of culture must be an analysis of the ways that people not only pick up and pass on cultural traits, but choose them, modify them, and use them to influence the behavior of others. I first proposed this a few years ago by suggesting a twist on the common viral analogy for culture. Cultural traits, I wrote, are less like wild viruses than like biological warfare viruses, both being engineered, produced, and spread by evolved, self-interested organisms for strategic reasons (Cronk 1991a). But this analogy has at least one major flaw: Interpreted literally, it would mean that the purpose of culture traits is to kill other people!

As part of my continuing effort to find an improved metaphor for the role of culture in human affairs, I place tongue in cheek and offer the following: Culture is to human social interaction as mud is to mud-wrestling. The metaphor of wrestling conveys the idea that social interaction is in many ways a contest or struggle between people with competing goals. But wrestling of the non-muddy variety does not do the metaphorical job. The mud is needed to stand for culture in order that the analogy may more fully convey the nature of human social interactions as they take place in cultural contexts. Just as mud drastically changes the nature of the contest when it is introduced into a wrestling match, so does culture drastically change the nature of social interaction in humans compared to nonhumans. Just as mud-wrestlers are coated in mud, people are coated in culture: It shapes who they are and how they interact with others in profound ways, which of course is an old lesson to anthropologists. Like mud, culture can get in your eyes, leading you to do things that may not be in your own best interests. Just as mud-wrestlers may use the mud itself in their contest—flinging it, wallowing in it, using it to blind their opponents—so do people use culture as a tool in social interaction. Just as one wrestler covered in mud is likely to muddy others in the ring, so do culture traits cling to people and move from one to another through social contact. The mud-wrestling analogy also inspires

some interesting questions about culture. For instance, how deep is the mud? That is, to what extent does culture limit and guide human actions? Are we up to our necks in mud, able to move only in culturally prescribed ways, or is the mud down around our ankles, causing us to slip now and then but not influencing our basic strategies in meaningful ways? Or is it somewhere in between? As apt as the mud-culture metaphor may be, the wrestling part of the metaphor needs some modification because it makes it appear that all social interaction consists of contests in which only one person may win. That, of course, is not the case. A better image might be an *n*-person mud *melée*, in which cooperation and coalitions (tag teams?) are possible.

In the context of this metaphor, behavioral ecologists have largely been studying wrestling—human social interaction—as if there were no mud, no culture. The cultural transmission theorists, in contrast, have largely been studying the properties of the mud while ignoring the wrestling. Although this metaphor is weakened by its failure to capture the idea of culture as a replicator or the idea that cultural traits may spread that are detrimental to individuals' inclusive fitness as well as the genetic and viral analogies described above, it may help to clarify a way that the largely acultural behavioral ecological approach can begin to incorporate the notion of culture.

Manipulation, Signals, and Culture

My suggestion is that we need to examine how people *use* culture in their efforts to manipulate one another in ways that would have led to enhanced inclusive fitness in the environments of human evolution. Social manipulation is an old topic in anthropology as well as in the other social sciences. Unfortunately, the existing literature on social manipulation in humans remains largely uninformed by Darwinian theory. Social manipulation among nonhumans in recent years also has become the subject of a great deal of research, particularly in primatology (e.g., Byrne and Whiten 1988). This has been encouraged by the development of the idea that the evolution of intelligence among primates in general and among humans in particular may have more to do with a need to manipulate social situations than with a need to manipulate the physical environment (e.g., Humphrey 1976, Jolly 1966). The evolutionary biological study of social manipulation among humans is so far not as well developed (but see Barkow 1989, pp. 62–72 and pp. 98–101; Kaplan 1987; McGuire and Troisi 1990; Rue 1994). One exception is the recent development of interesting suggestions about the role of moral systems and moral sentiments in social situations. Alexander, for example, has suggested that moral systems may be ultimately based on a sort of reputation management (Alexander 1987). His idea, labeled “indirect reciprocity,” is that if an audience is present one might be more willing to act cooperatively or altruistically in hopes of getting a reputation for cooperativeness and generosity that may have payoffs in the future (see also Cronk 1994a, 1994b; Frank 1988; Irons 1991).

The study of social manipulation in nonhumans is closely related to the study

of signaling systems because signals are so often used to manipulate the behavior of others. This was not always well understood. Until the 1970s, ethologists viewed animal signals primarily as mutually beneficial transfers of information from one individual to another (e.g., Cullen 1966), an idea that became problematic when changes in evolutionary theory shifted the focus from group to individual benefits (see Trivers 1985, chap. 4, for an explanation of this shift). Dawkins and Krebs (1978) proposed that signals may best be seen as attempts to manipulate others rather than to inform them. According to Dawkins and Krebs, "Communication is said to occur when an animal, the actor, does something which appears to be the result of selection to influence the sense organs of another animal, the reactor, so that the reactor's behaviour changes to the advantage of the actor." This idea was based on earlier work by others on such topics as parent-offspring competition (Alexander 1974; Ghiselin 1974; Trivers 1974; West-Eberhard 1975), bluffing during threat displays (Maynard Smith and Price 1973), and the manipulative use of alarm calls (Charnov and Krebs 1975).

Dawkins and Krebs's (1978) focus on manipulation ran the risk of creating a picture of signal receivers as mindless dupes. Krebs and Dawkins (1984) redressed the balance by paying attention to the evolution of receivers as well as signalers. They proposed that if signal receivers are being manipulated for the benefit of signal senders, natural selection will favor the evolution of abilities among receivers to discriminate among signals, with the result being coevolutionary arms races with signalers developing more and more convincing signals and receivers becoming increasingly resistant to signalers' attempts to manipulate them. Krebs and Dawkins proposed that the intensity of these selection pressures will depend upon the degree to which signalers and receivers share common interests. If there is a great overlap between their interests, both will benefit from efficient communication, and signals should evolve to be simple and quiet. If, on the other hand, signalers and receivers share few or no interests, receivers will be under great pressure to develop abilities to detect and resist manipulative signals, which in turn will put pressure on signalers to evolve better, stronger, and more convincing signals. In short, cooperative signals should be muted and economical, while non-cooperative signals should be conspicuous and repetitive. Krebs and Dawkins (1984) illustrate their point with an analogy from human communication, contrasting the subtle signals passed between a couple at a dinner party that it may be time to leave and "the Bible-thumping oratory of a revivalist preacher."

A commonality of interests between signalers and receivers can arise for a number of reasons, including genetic relatedness, having common descendants, and likelihood of future interaction. Using reasoning based on the Prisoner's Dilemma game, Wiley (1983) argues that simple honesty and unritualized signals are likely to develop between individuals who are acquainted and who interact repeatedly, and that, in contrast, ritualization and escalation by bluffing and devaluation should evolve more often for interactions between unacquainted individuals. Otte (1974) made a similar prediction, referring specifically to humans: "The tendency to deceive should vary as a function of the strength of association between individuals, with less misinformation passing among individuals who

are likely to associate for extended period than among persons interacting only briefly." Wiley's and Otte's predictions amount to a subset of Krebs and Dawkins' more general predictions about cooperative and non-cooperative signals (see also Cheney and Seyfarth 1990, 1991; Kaplan 1987; Markl 1988; Smith 1986).

For successful manipulation, honesty may sometimes be the best policy, even when there are conflicts of interest between signalers and receivers (Harper 1991). Amotz Zahavi has argued that when the cost of a signal correlates with the honesty of the signaler, with dishonest signalers incurring a higher cost than honest ones, selection will favor honest signaling even between rivals (Zahavi 1975, 1977, 1979, 1987). For example, physical characters that impose burdens on their bearers may function as reliable signals of physical vigor either to predators (Zahavi 1987) or potential mates (Zahavi 1975, 1977). Zahavi illustrates this "handicap principle" through an analogy with the history of lace in Europe. Between the 16th and 18th centuries, lace was handmade, very expensive, and widely used. When lace-making machines were introduced in the 19th century, its price dropped, and, after an initial large increase, eventually so did its use. Zahavi (1987) suggests that this is because lace lost its value as a reliable signal of wealth. Robert Frank (1988) has reinvented this idea under the label of the "costly-to-fake principle." He illustrates it with the example of a college degree with honors from an elite university. An employer looking for a smart, hardworking person can rely upon such a signal because it is costly to fake, that is, if a person were not really smart and hardworking, he or she would have a hard time accomplishing the task of completing a degree with honors at an elite university. Dawkins and Guilford (1991) have pointed out that the power of this "handicap" or "costly-to-fake" principle to select for honest, expensive signals may be reduced if it is expensive for signal receivers to detect deception. In some cases, they argue, the very characteristics of a signal that make it believable, such as its duration or variety, also make it expensive for the receiver to measure. Because of the sometimes high costs of detecting deception, selection may favor receivers who settle for less informative signals that are also less costly to receive, and dishonest signals may be common (see also Capp and Searcy 1991; Enquist 1985; Godfray 1991; Grafen 1990a, 1990b, 1991; Guilford and Dawkins 1991; Johnstone and Grafen 1992; Knapp and Kovach 1991; Maynard Smith 1991).

These ideas about animal communication have encouraged many new studies of manipulative intraspecific signaling among nonhumans. Although manipulation includes non-deceptive as well as deceptive signals, the most dramatic evidence of manipulation among nonhumans comes from studies of deception. Threat displays, for example, appear not always to accurately reflect an animal's likelihood or ability to carry out the threat (see Caldwell 1986; Caryl 1979, 1982; Hinde 1981; Maynard Smith and Price 1973; Steger and Caldwell 1983; Trivers 1985). False warning cries are sometimes given to distract competitors from food (Byrne and Whiten 1985; Matsouka 1980; Munn 1986; Rüppel 1986) and to gain control over social situations (Cheney and Seyfarth 1990; Gould 1983; Savage-Rumbaugh and McDonald 1988). False overtures at reconciliation, which are followed by attacks rather than acts of friendship, have been observed among sev-

eral species of nonhuman primate (Cheney and Seyfarth 1990), and one instance of injury feigning to avoid being attacked has been observed among chimpanzees (De Waal 1986).

The study of the role of signals in social interactions opens the door to the culture concept. Culture is the raw material out of which humans fashion the signals they use to manipulate one another, and it is mainly through signals that culture is made manifest and available for study. Furthermore, the manipulative view of signaling clarifies the relationship between culture and behavior and makes sense of discrepancies between them. It predicts neither that what is culturally valued will track fitness, because values that are publicly expressed may have more to do with manipulating people than with enlightening a field researcher about the verities of the culture, nor that there will be a neat and simple correlation between culture and behavior analogous to the relationship between genotypes and phenotypes. Instead, it predicts that there should be discrepancies between culture and behavior because it sees culture as something that is expressed through public pronouncements that are intended to manipulate the recipients' behavior in ways that may or may not be to their benefit. Thus, culture can be studied as an ideational system, and the problem of how it influences behavior can be recognized as an important and related but essentially separate issue from cultural evolution (see Durham 1991 for a similar point of view).¹

Examples

The focus in animal behavior studies on the use of signals in social manipulation has yet to be paralleled in studies of humans, but a few examples do exist of situations in which people seem to be using signals to manipulate one another for reproductive advantage of some kind. Some of the examples that follow are well documented, but most are more speculative and need further study. Most of these examples are concerned with non-cooperative communication, although, as explained above, signals can also be cooperative, with both signaler and receiver benefitting. The reason for this focus on non-cooperative signals is not that some scholars are correct that "human society is a network of lies and deception" (Alexander 1975; see also Bailey 1991), although this may be true. The amount of communication in human societies that is honest or deceptive, cooperative or non-cooperative, is an open empirical question. Rather, the reason is that, if it is true that "what has been most emphatically proclaimed is most likely

¹ What are we to make then of "ideal culture," that is, those cultural traits that do not seem to have much influence on behavior? Oddly, they may be some of the fittest cultural traits (*sensu* Durham 1991) of all and therefore some of the most interesting ones for cultural transmission theorists to study. Imagine two cultural traits, one that actually does influence behavior and another that is spread from person to person as a platitude that is more often ignored than observed. Which one is likely to be more successful? The one that actually influences behavior sticks its neck out and runs the risk of being selected against, while the trait that is simply passed from person to person with little effect on anything material is rarely put to any sort of practical test. These sorts of cultural traits might be analogous to commensal organisms, which derive benefits from their hosts but, unlike parasitic organisms, do them no harm.

to be manipulative exhortatory information" (Harpending et al. 1987), then that is precisely the sort of information that social and behavioral scientists have been studying for so long. Furthermore, because of its predicted loud, public nature, non-cooperative communication is likely simply to be much easier to study than cooperative communication, and it thus is a good place to begin research.

Kin term manipulation among the Yanomamö. The Yanomamö of Venezuela and Brazil, like many other peoples, have a prescriptive rule of bilateral cross-cousin marriage that is expressed in their Iroquois-style kinship terminology. This means that a man must marry a woman of his own genealogical generation who is either his mother's brother's daughter or his father's sister's daughter, or a more distant cousin to whom the same kinship term, *suaböya*, is applied. Parallel cousins (father's brother's daughters, mother's sister's daughters, and so on) are prohibited as marriage partners. A Yanomamö man uses the term *suaböya* for all women that he may marry under this rule, regardless of whether he actually marries them. The term thus encompasses a variety of concepts made separate in our own kinship terminology, including "wife," "marriageable female," "sister-in-law," and "female cross-cousin." The rule against marriage to parallel cousins is also expressed in the Yanomamö kinship terminology, which extends the nuclear family terms "brother" and "sister" to them. It is thus "incestuous" to violate the prohibition on parallel-cousin marriage. Marriages between people of different genealogical generations are also considered incestuous and are prohibited.

Because of the limitations this system puts on a man's potential wives, it regularly poses problems for men in search of women to marry. A major cause of the problem is the difference between average male and female generation times, which means that a particular male's *suaböya* relatives may be far too young or old for him to marry. The fact that most Yanomamö are related to their kin in more than one way presents a way out of the dilemma. Although strictly speaking a Yanomamö individual is supposed to emphasize the closest kin tie he has to another individual when deciding what kin term to use, it is possible to choose to emphasize other, more distant ties. This makes it possible for Yanomamö men to take some women out of "incestuous" categories like "sister," "mother," and "niece" and put them into the marriageable category of *suaböya*.

Chagnon (1988) has shown that this is precisely what male Yanomamö do. Using photographs to elicit kin terms used by males for actual female relatives, Chagnon demonstrated a marked tendency among adult Yanomamö males to move women from non-marriageable categories to the marriageable one of *suaböya* as well as to the category of mother-in-law (which includes potential mothers-in-law as well as actual ones). Moving women into the mother-in-law category may be a reflection of attempts to move such women's daughters into the *suaböya* category. The women reclassified as *suaböya* come more from younger terminological categories, such as nieces and sisters, than from the older categories of mothers and mothers-in-law. This may reflect the greater typical reproductive value of the younger women. Such reclassifications of women, although not un-

common, are against the rules. Attempts to reclassify female relatives can be very controversial in Yanomamö communities, presumably because one man's attempt to reclassify a female relative into the *suaböya* category may spell doom for another man's attempt to marry the woman himself. An element of nepotism creeps into such controversies: Yanomamö are much less likely to label marriages by their close relatives as incestuous than those of distant relatives (Fredlund 1985).

This is an excellent example of how an existing cultural code is manipulated for reproductive benefit. A few existing ethnographies include discussions of kin term manipulation, suggesting that it may be a widespread phenomenon (e.g., Gregor 1977, chap. 17). The use of kin terms to manipulate others may be fruitfully studied even in societies in which marriage rules are not expressed in the kinship terminology. For example, Daly and Wilson (1983) attribute phrases like "Brother, can you spare a dime" to attempts to exploit the expectation of benevolence among kin. Similarly, Johnson has suggested that the use of kin terms in political speech ("fatherland," "motherland," "brothers and sisters," "founding fathers," etc.) may be attempts to manipulate others through the manipulation of kin recognition mechanisms and nepotistic tendencies that evolved in social environments in which authority figures were in fact mainly kin (Johnson 1986, 1987, 1989). Finally, the Ju/'hoansi (or !Kung) of Namibia and Botswana have a complex system of kin terms and personal names that is ready-made for manipulation (see Lee 1994).

The Yanomamö example shows how the language of a rule against nuclear family incest ("you do not have sex with your sister/brother") can be extended in such a way that it prohibits sex with non-nuclear family members as well ("and your parallel cousins are also your sisters and brothers"). Nancy Thornhill has argued that this is a common pattern cross-culturally, that is, that incest prohibitions have more to do with regulating inbreeding and marriage among non-nuclear family consanguineous kin, such as cousins, and affinal kin, than with regulating sex within the nuclear family. She proposes that such regulation works to the advantage of rulers in stratified societies and of most men in egalitarian societies by limiting the ability of families to use marriage within families to concentrate wealth and power. Her model is supported by tests conducted on a worldwide sample of 129 societies (Thornhill 1990, 1991).

Fear of women in New Guinea. To demonstrate the difficulty of using informants' statements and cultural beliefs as proxies for actual behavior, Harpending et al. (1987; see also Harpending and Draper 1986, and Draper and Harpending 1982) focus on the loud proclamations made by men in many New Guinea highland societies about the dangers of sexual contact with females. Males in such societies are taught, for example, that sex with women is dangerous and polluting, and in some of these societies homosexuality is strongly encouraged (see Herdt 1984; Knauff 1986; Meggitt 1964; Read 1965). Harpending et al. argue that such teachings are attempts by males to manipulate their reproductive competitors.

This case offers a good opportunity to test the predictions described above

about when signals should be loud and when they should be muted. First, the loudest, most conspicuous, and repetitive signals should be used by men when they are dealing with their own direct reproductive competitors, while more muted, economical, and truthful signals, perhaps including private confessions that women may not be so bad after all, should be used in communications between men who share reproductive interests, such as, perhaps, sons and brothers. Second, the most manipulative signals should be used between rivals who are on roughly equal footing in the competition for matings, while men should not spend time trying to manipulate the behavior of men who are either of so much higher status and ability that competition with them is a fantasy or who are so far out of the competition, due perhaps to age, poverty, or disability, that manipulating their behavior would have no payoff.

Support of the elderly by their children. A common normative statement, recorded time and time again by ethnographers working all over the globe, is that children have a moral obligation to help support their aged parents. This is often phrased as a motivation for having children or as an explanation for why people in less economically developed societies tend to have many children, that is, they are a sort of primitive old-age security scheme. Often this idea is enshrined in colorful folk tales that are assumed to reflect the deep tendencies of the culture at hand (see Cronk 1990). Such statements present a problem for the evolutionary biological approach to human behavior: How can such statements be so common when it is not clear how natural selection could have favored the evolution of an organism that routinely lived long enough to become a burden on its own offspring (Turke 1988, 1989)? Is this just one way in which human behavior cannot be explained by evolutionary theory, or is there something else going on? The possibility exists that, far from being simple, straightforward reflections of people's feelings and intentions, such statements are actually attempts to manipulate the behavior of others.

The manipulation could work in at least two ways. First, children could be attempting to manipulate their parents. It is cheap for children to promise old-age support because in traditional societies the necessity of actually having to pay it is unlikely, but such promises may have the benefit of keeping benefits from parents flowing. In this case, one would expect adults with living parents to be the individuals who most enthusiastically and loudly proclaim the importance of children's obligation to provide support for their parents in old age. One would also expect such adults whose parents have a great deal to offer in the way of heritable property to be more vocal about their intentions than those who stand to inherit little. Furthermore, if it is possible for parents to bias their benefits to their children, either in the form of their current behavior or the disposition of their property at their death, then one would predict a sort of escalatory, competitive arms race of declarations of support to develop among siblings. When no such bias is possible, perhaps because of existing rules about inheritance practices or because no significant heritable property exists, no such arms race would be expected. This interpretation is supported by some folk wis-

dom on the subject. For example, although among Indian peasants all children are exhorted to help support their elderly parents, it is well known that, as one of John Caldwell's informants said, "Without property, children do not look after their parents well" (Caldwell et al. 1988). Similarly, in another Indian village it was found that while landowners generally felt secure that their sons would provide old-age support for them, poor men were pessimistic about their children's magnanimity (Vlassoff and Vlassoff 1980).²

Second, parents could be attempting to manipulate their children. This would require at least two preconditions. First, elderly parents would have to have some ability to benefit their children. Such a situation has been documented on the Micronesian atoll of Ifaluk and among the Hadza foragers of Tanzania. On Ifaluk, older adults spend more of their time in productive activities than younger ones. The result is enhanced reproductive success for people with living elderly parents (Turke 1988). Among the Hadza, post-menopausal women work harder and produce more food than pre-menopausal women, possibly in order to enhance the reproductive success of their younger female relatives (Hawkes et al. 1989). Second, it would have to be the case that the ability of elderly parents to help their children is spread among several children while the burden of supporting them was by necessity concentrated on just one child. In that situation, parents would need to try hard to convince at least one of their children of his or her obligation to support them in their old age. Following the reasoning of Krebs and Dawkins that "what has been most emphatically proclaimed is most likely to be manipulative exhortatory information" (Harpending et al. 1987), another logical prediction would be that statements about the obligation of children to support their parents would be most frequently and loudly reiterated by parents in situations where such support is in the greatest doubt, perhaps because the parents have little to offer their adult children in exchange. This would help to make sense of the observed discrepancies discussed above between people's expressed expectations of old-age support and the actual frequency of such support and of the doubts expressed by poor parents about the amount of support they could expect from their children.

Mate attraction and retention. Attempts to use signals to manipulate the behaviors of others may be especially intense when mating is involved. David Buss has pioneered the use of sexual selection theory as a predictor of mating tactics among humans. Much of his research has focused on the things people say and do in order to attract (Buss 1988a) and keep (Buss 1988b) mates. His results generally support predictions derived from sexual selection theory that control of resources is a key to male success in mating while physical attractiveness is more important for female success. Tooke and Camire (1991) have used Buss's methods

² When the system of inheritance is matrilineal, with property flowing mainly from men to their sisters' children rather than to their wives' children, a logical prediction would be that the targets of such manipulative statements would be mainly mothers' brothers, not fathers (Irons, personal communication).

to look specifically at deceptive mating tactics and have obtained similar results. In all three of these studies, the method involved three steps: (1) elicit a list of tactics; (2) ask a separate group of subjects how often they have used the tactics listed; (3) ask a third group of subjects how effective they think the tactics may be in order to determine whether the most frequently used tactics are also those perceived to be the most effective.

Buss and Dedden (1990) used a slightly different method to study the ways American undergraduates derogate their sexual competitors. Their basic predictions, again derived from sexual selection theory, were that males would tend more than females to try to derogate other men on the basis of their abilities to accumulate and control resources and the "physical, psychological and behavioral characteristics that tend historically to have been correlated with resource acquisition," while females would tend more than males to try to derogate other females on the basis of their reproductive potential, as indicated by such physical characteristics as apparent age, and the likelihood that they would simultaneously be sexually available and offer a mate high confidence of paternity (Buss and Dedden 1990). They followed a four-step procedure for testing these predictions: (1) elicit a list of derogation tactics; (2) ask a separate group of subjects how likely men and women would be to perform each tactic; (3) ask another group of subjects how effective they think the tactics would be; (4) ask another group of subjects consisting of married couples how likely they and their spouses would be to use each tactic.

Although Buss and Dedden's study is laudable for its appreciation of the importance of the manipulative use of signals among humans and its detailed attention to the ethological literature on communication, it falls short of what would be needed to demonstrate that any actual manipulation occurs. There are two reasons for this. First, the researchers failed to ask the key question asked in previous studies of this kind: How often have you either used the tactic in question or observed its use? Instead, Buss and Dedden tested their subjects' expertise as folk psychologists by asking such questions as what statements are more likely to be used by men than by women and vice versa to derogate sexual competitors. While the fact that these questions elicited responses that tended to fulfill the predictions is interesting, it is not a real test of the predictions or a demonstration of actual manipulation of the reputations of others. Second, in order to determine whether any actual manipulation has ever occurred, one would also need to assess the effects of the derogative statements on the behavior of those who hear them (Martin Daly, personal communication). Both of these issues could easily be addressed in a new study on this topic.

A problem common to all of these studies is that the responses not only generally fit the predictions of sexual selection theory, they also fit the expectations of American folk psychology, for example, that women are more concerned with their physical appearance than men and men are more concerned with showing off their property and status than women. It would, therefore, help demonstrate the generality of sexual selection theory if these studies could be replicated

in other, very different cultures, a practice also pioneered in psychological research on mate preferences by Buss (1989). Such studies would need to take into consideration variations in local conditions, such as the importance of the physical abilities of males and the resources they control to female reproductive success and the importance of the physical appearance of females and the socioeconomic status of their parents to male reproductive success. Variations in local conditions could easily cause shifts in derogative techniques. For example, while "she is fat" may be derogatory to American undergraduates, it might be a wonderful compliment elsewhere, such as among the Kipsigis of Kenya, where men pay higher bridewealth for plump than for skinny brides (Borgerhoff Mulder 1988).

Marriage negotiations. In most traditional societies people, especially women, do not normally choose their own mates, and so whatever mate preferences they have must be filtered through the intermediaries in charge of marriage negotiations. Joseph's study of the Berber provides a rare glimpse into how marriages are negotiated in one such society (Joseph 1974). Among the Berber, it is ostensibly the fathers of brides and grooms who choose mates for their offspring and negotiate bridewealth and dowry payments. Although to some extent this normative pattern is followed, other parties, most notably the prospective brides and grooms themselves and their mothers, are able to manipulate the patriarchs into choosing particular partners. In a typical case, a man may be considering several possible brides for his son. If the son himself or his mother prefer a particular woman to be his mate, they will try to narrow the choice down to her by singing her praises and criticizing her competitors. If some of the competitors are not kin and the preferred partner is kin, then the groom's mother may extol the virtues of marrying kin, such as the advantage of keeping property in the family. Or, if the groom and his mother are trying to eliminate kin from the running, they may explain the advantages of spreading one's alliances in the community by marrying nonkin. If this does not narrow the field down enough, other girls can be eliminated with other innuendos — this one's family has a bad reputation, that one's family has traditionally been our enemy, this girl is lazy, that one is not a virgin, and so on. This process usually narrows the choice down to a single girl without the patriarch losing his sense of control over the procedure. If all else fails and the patriarch still does not select the right girl, the groom can threaten to break his ties with his family if he is not allowed to choose his own bride.

A study of marriage negotiations informed by evolutionary biological theory would include questions about the extent to which men and women attempt to manipulate the process to obtain mates that better fit predictions of mate preference models derived from sexual selection theory (Buss and Dedden 1990). For example, do males argue in favor of younger women of potentially higher reproductive value? Is the woman's previous sexual behavior an issue (as it appears to be in the Berber case)? Do females argue in favor of males who have greater potential for control of key resources?

Methodological Suggestions

Because the human social world is so complex, manipulation is an inherently difficult thing to study. The fact that it takes place in the context of culture, often a culture that is quite alien to the field researcher, makes such a study even more difficult. However, there may be ways to systematize the study of manipulation and to test predictions about it in rigorous ways. Two phenomena that ethnographers have in the past mostly seen as problems may in fact provide opportunities for insights into manipulation.

The first is the Rashomon effect, named after a film by Akira Kurosawa in which different versions of the same event are told by different witnesses. Each version portrays the teller in the best light. The Rashomon effect has been noted by ethnographers in discrepancies both among different informants' versions of the truth (e.g., Condran and Bode 1982; Crissman et al. 1989; Frankel n.d.; Weingrod 1981; Werner and Schoepfle 1987) and among different ethnographers' interpretations of a particular culture (Heider 1988). A typical attitude among anthropologists is that although the Rashomon effect can be useful, the ultimate goal of the ethnographer is not to dwell on such discrepancies among informants but to find ways to resolve them (e.g., Werner and Schoepfle 1987). Although concern for resolution of such discrepancies is appropriate for some purposes, it is the discrepancies rather than the similarities among different informants' accounts that are of the most use to students of manipulation.

The questions to ask when faced with such discrepancies are obvious. First, what do the various people stand to gain from their versions? In the case of the film *Rashomon*, the advantages to each character are clear. A bandit presents himself as seductive and heroic, a woman presents herself as virtuous and faithful to her husband, and so on. If only situations in the real world permitted such simple interpretations, researchers would have it easy. Researchers may be able to make their task easier by deliberately seeking out Rashomon-type effects by identifying individuals who may be predicted to have very different perspectives on events because of their very different situations in life. This technique may be easiest to use in highly stratified and otherwise differentiated societies, although even in relatively simple, so-called egalitarian societies conflicts of interest can be identified that may lead to Rashomon-type effects.

The second phenomenon that might prove useful to students of manipulation is the audience effect. While the Rashomon effect involves variations in informants' statements when there is one interviewer and several informants, the audience effect involves variations in statements from a single informant when he is exposed to different audiences. Like the Rashomon effect, the audience effect is common in everyday life. For example, job seekers tailor their resumés to suit different positions, emphasizing one specialty in one case and another in another case in an attempt to manipulate those doing the hiring, and scholars often take the same basic piece of research and publish it several times, reshaping it to suit different audiences. The audience effect has also been observed by fieldworkers, although most commonly it is seen as a problem, not a source of new insights.

Chagnon, for example, found that only by being the sole member of the audience when conducting genealogical interviews with his Yanomamö informants could he hope to get accurate information from them (Chagnon 1992). Scott (1985, 1990) put the audience effect to a constructive use in his efforts to understand the discrepancies between statements made by Malay peasants in private settings (the "hidden transcript") compared to settings in which members of the elite are present (the "public transcript"). Audience effects have been observed in other species, as well. Rhesus monkeys, for example, appear to assess their audiences before making a food call after spotting a food source. When no other monkeys appear to be present, they withhold the call and obtain more food than they would if they called (Allen and Hauser 1993; Hauser and Marler 1993a, 1993b). In a laboratory study, male vervet monkeys adjusted their behavior toward infants according to whether or not the infants' mothers were visible, behaving more kindly toward the infants when mothers were visible and more agonistically when they were not (Keddy Hector et al. 1989). When threatened by an aerial predator, male domestic chickens (cockerels) are much more likely to give an alarm call when other chickens are present than when they are alone. Domestic chickens also give calls when given food, which attract other chickens. Cockerels are much more likely to give such calls when females are present than when only males are, suggesting that they are unwilling to share information about food with reproductive competitors (Marler et al. 1991).

Although humans cannot be manipulated as easily as chickens, there are several simple ways that researchers can actively seek out audience effects. One way is to vary the identity of the interviewer by using assistants. Assistants can be males or females, young or old, educated or not, high status or low status, members of the group under study or outsiders. The best ways in which to vary the characteristics of the interviewers will depend upon the specifics of the research situation. This technique has been used by Robert Aunger, who has compared answers given by the same set of informants to questions posed by himself and by a native research assistant on the topic of personal food taboos among Ituri forest groups (Aunger 1994, 1995).

Another way to elicit audience effects is to vary the settings of interviews, conducting some privately with no audiences and conducting others in groups, varying the people present in ways that are meaningful given the topic being explored. For example, a person studying the possibility that children manipulate their parents by making promises of old-age support would need to vary the mix of ages and the sorts of relatives present in different interviews.

Chagnon's study of Yanomamö kin term usage presents an interesting opportunity to explore audience effects. Would his informants' answers to questions about what they call various relatives vary according to the audience present at the interview? Would they be more likely to push the bounds of propriety and use terms like "marriageable female" in questionable cases when alone with the interviewer or when only close kin are present (especially classificatory brothers, who also stand to gain from such reassignments), and would they avoid such usages when competing males are present? Would males be more likely to reclas-

sify females when their audience consists of males of lower status than when their audience consists of competing males of higher status?

The audience effect raises an interesting epistemological question for social scientists. The researcher's temptation is to think that the answers given him in private are likely to be the least influenced by the interviewee's situation in life and thus are thought to be more "honest" and revealing of his real sentiments. But which is more "real" and more revealing of the actual workings of a society: the answer given by someone free of the social constraints he normally operates in, or one that would reflect how he actually must live his life? This is an open question, certainly, but the way to answer it is not to assume one response is right and the other wrong. Rather, by approaching the issue from both angles we are more likely to understand the intricacies of the social situation.

CONCLUSION

Although human behavioral ecology has made great strides without incorporating the culture concept in any very meaningful way, there is no escaping the fact that culture is a crucial element in any full understanding of human behavior, including one with evolutionary biology as its starting point. Although human behavioral ecologists have made a lot of progress by borrowing models from the study of nonhuman species, the appeal of this approach will never expand beyond its current small group of practitioners unless it somehow incorporates the concept of culture. One way to do this is through cultural transmission models. Another, complementary way to accomplish this goal is to recognize culture as the context of human social interaction and to examine its role as the raw material out of which signals—the medium of social interaction—are formed.

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