Article

EVOLUTIONARY THEORIES OF MORALITY AND THE MANIPULATIVE USE OF SIGNALS

by Lee Cronk[1]

Abstract. Several attempts have recently been made to explain moral systems and moral sentiments in light of evolutionary biological theory. It may be helpful to modify and extend this project with the help of a theory of communication developed by ethologists. The core of this approach is the idea that signals are best seen as attempts to manipulate others rather than as attempts to inform them. This addition helps to clarify some problematic areas in the evolutionary study of morals, and it generates new, testable predictions about moral statements.

Keywords: communication; cultural transmission; evolutionary biology; morality; signals; social manipulation.

This article reviews and criticizes recent attempts to understand human moral sentiments and moral systems in light of evolutionary biological theory. The criticisms are based mainly on an approach to communication developed by ethologists for the study of animal signaling systems. The core idea of this approach is that signals are best seen as attempts to manipulate, rather than inform, other organisms. It should be noted at the outset that this article is not about what has come to be known as "evolutionary ethics" (Ruse 1986; Williams 1988); i.e., attempts to derive ethical propositions from evolutionary theory, although some of the observations presented may have implications for that endeavor. The first section of the paper reviews several evolutionary theories of morality; the second describes the view of signaling developed recently by animal behaviorists as manipulation, and the third criticizes evolutionary theories of morality in light of this approach to communication.

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EVOLUTIONARY THEORIES OF MORALITY

The growing literature on evolution and morality concerns one central question: Why do we have morality? How could a concern for the welfare of others evolve if, as is currently thought to be the case, natural selection only rarely favors traits that benefit groups but not individuals (see Trivers 1985, chap. 4; Williams 1966)? The main theorists have taken three different but related approaches to this issue. One group has attempted to explain the evolution of moral systems by focusing on how individuals may benefit from attention to moral rules and the welfare of others. Another group has proposed that a process of cultural group selection may favor norms that encourage people to sacrifice for the benefit of the group. A third group has focused on why humans have a specific set of psychological adaptations associated with morality, i.e., a moral sense or moral sentiments.

INDIVIDUAL BENEFIT MODELS. Richard Alexander (1985, 1987; see also Irons 1991) is the most prominent representative of the first approach. He has argued that moral systems are best understood as ways of solving conflicts of interest that arise within groups. According to Alexander, finding solutions to such conflicts was advantageous during human evolution in between-group competition because it allowed cooperating groups to grow larger. Moral systems work to reduce within-group conflict through the use of what Alexander calls "indirect reciprocity" mediated by reputation. "Direct reciprocity" refers to exchanges of aid between just two parties (Trivers 1971). For example, individual A may help individual B in the hope that individual B may reciprocate directly in the future with aid for A. Indirect reciprocity involves an audience. Knowing that individual C is watching, A helps B in the hope of gaining a reputation for generosity and trustworthiness that will lead to favorable treatment from C in the future. Thus, a concern with one's own reputation leads one also to be concerned with the welfare of others.

Other theorists have criticized Alexander's model on two main grounds. William Irons (1991) has argued that, although in Alexander's view moral systems are basically contractual, in the real world they often involve considerable amounts of coercion. Thus, the relative power of each individual is important to consider when attempting to understand the specific details of a particular moral code. Robert Boyd and Peter J. Richerson (1989) have attempted to model indirect reciprocity using a modification of the Prisoner's

Dilemma game, concluding that indirect reciprocity is likely to be an important contributor to the spread of cooperative behavior only when the groups involved are "fairly small." However, this finding is based on an unrealistically restrictive assumption about the amount of information available to individuals about the past behavior of other individuals. This assumption does justice neither to Alexander's notion of reputation nor to the great concern with reputation and the amount of gossip surrounding it that we find in human societies.

Boyd and Richerson's own work on moral systems has been inspired in large part by an amount of cooperative and altruistic behavior in human societies that cannot be explained by the theories of kin selection (Hamilton 1964) and reciprocal altruism (Trivers 1971; see Boyd and Richerson 1988). One approach they have taken is to modify the game theoretical models previously used to explain the evolution of cooperation (Axelrod 1984) by considering the addition of punishment for noncooperation in addition to the low payoff when both players fail to cooperate. They argue that "if the costs of being punished are large enough, *moralistic* strategies which cooperate, punish noncooperators, and punish those who do not punish noncooperators can be evolutionarily stable" (Boyd and Richerson 1992, 171). They argue that such moralistic strategies can cause any behavior that is costly to individuals, not just altruistic behaviors, to be evolutionarily stable.

If one considers Boyd and Richerson's criticisms of Alexander's indirect reciprocity model, it is ironic that Irons (1992) has proposed that their punishment model is essentially the same as Alexander's. Irons suggests that the general model has the following elements: (1) human beings observe others not only when they are in direct interactions with them but also when others are interacting with third parties; (2) the information thus gathered indirectly is used to make decisions about how to interact with others directly; and (3) these direct interactions can consist of rewards for behaving in approved ways, punishments for behaving in unapproved ways, punishments for failing to punish others, punishments for giving inappropriate rewards, and rewards for giving appropriate rewards.

Paul Allison (1992) has proposed another model of the evolution of beneficent norms that can be seen as essentially a rephrasing of this same general model. His proposal is that there may be a cultural analogue to the way that a genetic predisposition for altruism can be favored through kin selection. The theory of kin selection predicts that a gene for altruism will spread if it causes organisms to act altruistically toward others who are likely to carry the same gene,

such as close relatives. Allison's suggestion is that a similar thing could happen with a cultural rule for altruistic or beneficent behavior. If people have a general rule that tells them to "be good to those who have a higher than average probability of being carriers of this norm," then this rule will tend to spread. If one way to know whether others carry this norm is to observe their interactions with others, then this is essentially the same idea as Alexander's model of indirect reproduction mediated by reputation and Boyd and Richerson's punishment model.

Allison's model has the advantage of reminding us that people may use cues other than observed interactions, such as whether or not people share other cultural practices, as indicators of the likelihood that others will be cooperative, because conformity to those practices may indicate adherence to shared beneficent norms. Particular kinds of clothing, speech, or dietary habits, for example, are commonly used to mark boundaries between groups and define the groups within which people are thought to be relatively trustworthy. An interesting example of this phenomenon comes from the !Kung San hunter-gatherers of Botswana and Namibia. The !Kung maintain social networks among individuals in different bands through a system of reciprocal exchange called *hxaro*. Most adults have several *hxaro* partners with whom they occasionally exchange gifts. In times of trouble, one can call on one's *hxaro* partners for aid. *Hxaro* networks thus operate as risk-pooling groups. !Kung arrowhead styles, which vary from individual to individual, tend to be similar within such risk-pooling groups but different between them, and when !Kung are shown unfamiliar styles of arrows they express doubt about whether the people who made them would share any of their values (Wiessner 1983, 269).

CULTURAL GROUP SELECTION. Another approach that has been taken to the study of the evolution of systems of moral rules is to posit the existence of cultural group selection, a process distinct from and not dependent upon biological group selection (Boyd and Richerson 1985, 1990a, 1990b; see also Campbell 1975, 1983, 1991; Hayek 1973, 9; Jencks 1990). The inspiration for much of this work is the idea that human behavior is much more altruistic and cooperative than can be explained by kin selection (Hamilton 1964), direct reciprocity (Trivers 1971), or indirect reciprocity (Alexander 1987). Although exactly what sorts of behaviors need to be explained is often left vague, Campbell (1991, 99) is quite specific, focusing his attention on the moral orders in archaic city states, finding it a "puzzle" that such societies typically have beliefs involving

"heavens, hells, and reincarnations" and wasteful royal funerals (1991, 99). Campbell is motivated not only by such "puzzles" but also by the idea that human society would not be possible were it not for moral codes, which he thinks allow us to overcome the fundamental selfishness of human nature and our lack of any innate moral sense.

Although some have proposed biological group selection as possibly responsible for human moral systems (e.g., Eibl-Eibesfeldt 1982), this idea is rejected by most theoreticians. The basis for rejecting the hypothesis is that it runs counter to the well-established principle in evolutionary biology that natural selection favors traits that benefit groups over those that benefit individuals only when migration rates between groups are unusually low and the rate of extinction of entire groups is unusually high (see Trivers 1985, chap. 4; Williams 1966). *Cultural* group selection is a different process that does not require such unusual circumstances. It relies instead on the existence of culturally transmitted information and a tendency for people to conform to local behavioral patterns. In such circumstances, large behavioral differences between groups can arise even if the rate of migration between groups is high (because newcomers adopt local behaviors) and rates of extinction of entire groups are low (because culturally defined groups can cease to exist without the death of all their constituent members). In such a situation, rules that help groups persist and grow will be replicated at higher rates even if they encourage individuals to behave in self-sacrificial ways. Thus, the proponents of cultural group selection argue, the moral systems that call for altruism may persist and spread because of their benefits on the level of the group, not on that of the individual.

MORAL SENTIMENTS. A distinct but closely related line of research has concerned the way people internalize moral norms; i.e., why people have a moral sense or moral sentiments. That such a tendency is actually part of human nature is not universally accepted (e.g., Campbell 1991 and above; Williams 1988). However, it takes very little self-reflection to realize that although systems of moral rules could in theory be maintained simply through conscious, rational thought and although following and enforcing moral rules may be a rational thing to do, most people's first and often their most powerful response to perceived immorality is an emotional one.

Ruse (1986) has suggested that we have innate predispositions to cooperate with others because doing so is often in our genetic interests. The same thing could be accomplished in other ways, such

as through the sort of hardwired behavioral patterns we see in social insects or through the use of conscious, rational calculation. Ruse suggests that we instead have an innate predisposition to behave cooperatively because it "is a cost-effective way of getting us to cooperate, which avoids both the pitfalls of blind action and the expense of a superbrain of pure rationality" (Ruse 1986, 99).

Frank (1988) has a somewhat different model of how a moral sense could have evolved. He proposes that moral sentiments and other emotions may help to solve "commitment problems," which arise when "it is in a person's interest to make a binding commitment that will later seem contrary to self-interest" (Frank 1988, 47). For example, say that a kidnapper would like to set the victim free, but feels this is impossible since the victim might go to the police. It is then to the victim's advantage to give the kidnapper something that would discourage the victim from going to the police. The victim could, for example, allow the kidnapper to photograph the victim committing a degrading act (Schelling 1960, cited by Frank 1988, 6). People considering a cooperative arrangement face a similar problem: How can both parties be sure that the other party will not cheat on the arrangement if given the chance? If this problem is not overcome, then the cooperation will not occur, and both parties will lose in the short run.

Frank suggests that moral sentiments help to solve such dilemmas by leading people to behave in ways that may not be in their rational self-interest in the short run. For example, if one displays a positive moral sentiment like honesty, this suggests to potential cooperators that one will not cheat in cooperative arrangements even if to do so would be rational. Although this has the cost of leading people not to cheat when they have the chance, it has the benefit of allowing them to enter into more cooperative arrangements. Moral indignation and a desire for revenge can also help to solve the problem. If one displays a willingness to seek revenge when cheated, even if to do so is not rational, this will tend to discourage one's partners from cheating. This theory of moral sentiments fits in nicely with theories of moral systems, like Alexander's, that emphasize the role of reputation.

SIGNALS AND MANIPULATION

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. 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" (Dawkins and Krebs 1978, 283). 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).

This view of communication later became part of Dawkins's (1982) idea of the "extended phenotype." He argued that an organism's phenotype includes not only how its genes are expressed in its own body but also how they affect its environment. Spiderwebs and beaver dams are good examples of how an organism's phenotype may extend far beyond its own body due to the way the organism manipulates its environment. Since the environments of most organisms include conspecifics, the idea of the extended phenotype should also include the way one organism influences the behavior of others, which is usually done through signals. Dawkins's favorite example is the way that the singing of male crickets manipulates the muscles of female crickets. Dawkins argues that there is no good reason to restrict the phenotype of the male cricket to its own body and behavior and that there are good reasons for including in it the ways in which it affects the behavior of female crickets.

Dawkins and Krebs's (1978) focus on manipulation ran the risk of creating a picture of signal receivers as mindless dupes. The criticism this drew encouraged Krebs and Dawkins (1984) to redress 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 simple, quiet signals should evolve. 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 noncooperative signals should be conspicuous and repetitive. Krebs and Dawkins (1984, 391) 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."

For successful manipulation, honesty may sometimes be the best policy, even when there are conflicts of interest between signalers and receivers (Harper 1991, 386–87). Amotz Zahavi has argued in a series of publications 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 characteristics that impose burdens on their bearers may function as reliable signals of physical vigor either to predators (Zahavi 1987, 309) or potential mates (Zahavi 1975, 1977).

Zahavi illustrates this idea through an analogy with the history of lace in Europe. Between the sixteenth and eighteenth centuries, lace was handmade, very expensive, and widely used. When lace-making machines were introduced in the nineteenth century, the price of lace dropped, and, after an initial large increase in popularity, eventually so did its use. Zahavi suggests that this is because lace lost its value as a reliable signal of wealth (Zahavi 1987, 310). Although this "handicap principle" received little support for many years, it was recently revived by Grafen (1990a, 1990b, 1991; see also Capp and Searcy 1991; Enquist 1985; Godfray 1991; Guilford and Dawkins 1991; Johnstone and Grafen 1992; Knapp and Kovach 1991; Maynard Smith 1991).

These ideas have encouraged many new studies of manipulative intraspecific signaling among nonhumans. Although manipulation includes nondeceptive 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 reflect accurately 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, 409–10). False warning cries are sometimes given to distract competitors from food (Byrne and Whiten [1985] 1988; Matsuoka 1980; Munn 1986; Rüppel [1969] 1986) and to gain control over social situations

(Cheney and Seyfarth 1990, 196; 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 several species of nonhuman primate (Cheney and Seyfarth 1990, 195), and one instance of injury-feigning to avoid being attacked has been observed among chimpanzees (De Waal 1986).

The manipulative view of communication has had much less influence on the study of communication among humans, having been used so far mainly as a source of tentative suggestions and as yet untested hypotheses about certain types of behavior. For example, Harpending Draper, and Rogers (1987) have suggested that the loud proclamations made by men in many New Guinea highland societies about the dangers of sexual contact with females may be attempts by males to manipulate their reproductive competitors. Also using societies in New Guinea as examples, Kaplan (1987) has suggested that in societies in which males typically contribute little in terms of parental investment, males may attempt to attract mates through elaborate displays of physical attractiveness, athletic prowess, and skill in warfare. He predicts that where males contribute more parental investment, their displays will have more to do with the control of resources and social status than with sexual attractiveness. Several researchers (Daly and Wilson 1984; Johnson 1986, 1987, 1989) have suggested that kin terms may be used to manipulate others, such as in the phrase "Brother, can you spare a dime?" and in the use of terms like "fatherland" in political rhetoric (see also Chagnon 1988b for a detailed example of the manipulation of kin terms for reproductive benefit). Finally, Buss and Dedden (1990) have used the work of Krebs and Dawkins explicitly as the basis for a study of how people derogate sexual competitors.

Implications for Evolutionary Theories of Morality

Given the fact that many of the researchers who have developed evolutionary theories of morality have been motivated by a desire to explain what they see as high rates of altruism in human societies, it is surprising that more attention has not been paid to social manipulation, which has been cited several times by prominent authors as the "third source of altruism" after kin selection and reciprocity (Alexander 1974; Badcock 1986; Ridley and Dawkins 1981; Trivers 1985; West-Eberhard 1975; see also Durham 1991 on "imposition"). The manipulative approach to communication is mostly complementary to the various evolutionary theories of

morality discussed above. The key difference between the approaches is that while most existing theories emphasize the role of moral systems and sentiments in fostering cooperation and in encouraging altruistic, beneficent acts, the ethological approach to communication as manipulation inspires a somewhat more cynical view of moral rules that call for altruism. This cynicism was presaged by Maze, who referred to moralism as a "special technique of social manipulation" (Maze 1973, 202; see also Ray 1981).

Unlike the theories of morals described above, the manipulative approach focuses attention on conflicts of interest within groups, rather than between them. While an approach like Alexander's (1987), emphasizing how moral rules serve to enhance cooperation within groups, helps us understand rules that have a leveling effect in egalitarian societies, the manipulative approach can help us to understand moral rules that serve to justify and perpetuate inequalities in power, prestige, and access to resources and reproductive opportunities (see also Irons 1991).

The manipulative view of signals forces us to keep in mind the distinction between morally charged statements and morally relevant behavior. This distinction between people's statements about what they do, their statements about what they ought to do, and their actual behavior is an obvious one, but it is one that is frequently neglected despite a well documented lack of fit between statements and behavior in many areas of life (Cronk 1991, 1993; see Cancian 1975 and Deutscher 1973 for examples of such discrepancies). This distinction also focuses our attention on the selfish motives that may be behind exhortations to behave morally. The following quote from Friedrich Nietzsche expresses this insight eloquently:

> Praise of the selfless, sacrificing, virtuous—that is to say, of those who do not expend all their strength and reason on *their own* preservation, evolution, elevation, advancement, amplification of their power, but who live modestly and thoughtlessly, perhaps even indifferently or ironically with regard to themselves—this praise is in any event not a product of the spirit of selflessness! One's "neighbour" praises selflessness because *he derives advantage from it!* (Hollindale 1977, 101, Nietzsche's italics)[2]

This is not to say that moral statements are necessarily made in a cold, calculating way. Moral sentiments, which may have had their origin as solutions to the commitment problems described by Frank (1988), may also be useful in the manipulation of others through the invocation of moral codes. Even the most self-serving moral statements may be made with the most heartfelt sincerity, and they are likely to be all the more effective as a result (Maze 1973, 185).

If moral talk is cheap and sometimes effective in getting people to

behave in ways contrary to their best interests, then people ought to give more credence to more expensive signals. This has been suggested by Frank (1988), and the logic behind the idea is essentially the same as Zahavi's handicap principle described above. Frank suggests that signals of moral commitments that are costly to fake are likely to be better guides to future behavior than easily imitated signals. As an example of this principle, Frank offers the fact that employers looking for smart, hardworking people often hire people holding degrees with honors from elite universities. Although there may be plenty of people without such degrees who are also hardworking and smart, employers are safer if they pay attention to such a costly-to-fake signal.

EXAMPLES. The manipulative approach to communication also makes testable predictions about the signals that ought to be involved in manipulating others to act altruistically. Specifically, it predicts that the loudest moral proclamations are likely to be those that are most manipulative and exhortatory (Harpending, Draper, and Rogers 1987). The following three examples may help to illustrate what this approach may add to our understanding of moral systems and discourse on morally charged topics.

Warfare. Manipulative and deceptive signals are obviously used between adversaries in war, but a more interesting issue is how signals are used by combatants to convince others to contribute to the war effort, especially since such contributions often entail great risks and thus could be termed altruistic. Females who have something to gain from a victory in a war and little to lose from encouraging men to go to war may attempt to manipulate men to fight by favoring men with military experience. And, like so many other advertisers, military recruiting programs have certainly been known to appeal to young men with promises of enhanced virility and sex appeal. Kaplan (1987, 124–25) makes the related point that soldiers may volunteer to fight, despite the risk of death or injury, because of the chance that they may enhance their status by returning as heros, which in turn may contribute to their mating success. Such a behavioral signal of one's bravery and commitment to group benefit would be costly to fake (Frank 1988; Zahavi 1987) and therefore could serve as a reliable indicator of men's bravery and commitment to group benefit and enhance their reputations as cooperators (Alexander 1987). The question for the student of signaling is the extent to which these possible benefits are exaggerated by those who stand to benefit from men's participation in warfare and the extent to

which such signals succeed in getting men to behave in ways that are, on average, not beneficial to their inclusive fitness.

Religion. The manipulative approach to signals may also shed light on the moralistic content of religions. Guy Swanson (1960) found in a cross-cultural study that inegalitarian societies were much more likely than egalitarian ones to have religious beliefs that supernatural powers reward and punish individuals according to how well they behave, an observation which supports the common notion that religions are used by elites for social control.

The manipulative view of signals leads to predictions not only about the moral content of religions but also about the style of religious practices. If the manipulative view is correct, then the loudest and most elaborate religious moral proclamations should be those that most involve noncooperative signals; i.e., communication in which the signaler is attempting to get the receiver to act in a way that benefits the signaler and may harm the receiver. When a religion is being used by one group to manipulate others in noncooperative ways, either through conversion or indoctrination, then it should involve greater repetition of the religious message and more elaborate displays, such as rituals, temples, and other religious trappings, than if it is more cooperatively organized in a more egalitarian setting. At first glance, at least, this prediction appears to be correct. The larger, better-known religions like Christianity, Islam, and the various forms of Buddhism have histories of being used to control newly contacted peoples, place far greater emphasis on the acquisition of converts, and have more repetitiveness, more highly developed rituals, and other elaborations than the smaller religions of the world's tribal peoples; these smaller religions typically instill very little interest among participants in convincing any nongroup members of their correctness and have less repetitive, elaborate rituals and other religious trappings (e.g., no regular sabbath days, no required daily prayers). Similarly, religions that are used by elites in hierarchical societies for control of lower classes, such as those among the Aztecs and the ancient civilizations of the Mesopotamia and the Nile Valley, are also typified by repetitiveness, elaborate rituals, and religious trappings, such as large temples and pyramids. A more systematic test of these predictions would be worthwhile.

Religious rituals and other practices also may have the effect of making religious devotion a costly-to-fake signal (Frank 1988) and thus a better indicator of commitment to a specific moral code and to the well-being of one's fellow believers. Allison (1992, 294) suggests that ritual circumcision may be a way to make a signal of

commitment to a particular religious and moral code more expensive to fake and thus discourage free riders, and Irons (personal communication) has made the same suggestion about penile subincision among some Australian peoples. Repetitive prayers, tithing, and the memorization of religious texts may also be important elements of some religions precisely because they are difficult to fake.

Children's Support of Their Elderly Parents. A specific moral belief in many societies is the idea that children should support their elderly parents. This presents a problem for evolutionary theory since natural selection should not favor the evolution of an organism that routinely lives to be so old and helpless as to become a burden on its offspring (Turke 1988; 1989, 79). This problem may be solved if we look at moralistic statements about this obligation in the light of the manipulative view of signaling.

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 to support their parents in old age, since in traditional societies the chance of actually having to make good is not large. At the same time, such promises may keep benefits from parents flowing. In this case, one would expect adults with living parents to be the individuals who most enthusiastically and loudly proclaim their intention to support 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, no such arms race would be expected.

Second, parents could be attempting to manipulate their children. This would be advantageous to the parents if their ability to help their children during old age—as documented among such groups as the Ifalukese (Turke 1988) and the Hadza (Hawkes, O'Connell and Blurton Jones 1989)—were spread among several children while the burden of supporting the parents was by necessity concentrated on just one child. In that situation, the 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 expectation that "what has been most emphatically proclaimed is most likely to be manipulative exhortatory information" (Harpending, Draper, and

Rogers 1987, 138), another logical prediction would be that normative 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 discrepancies that have been observed between people's expressed expectations of support during old age and the actual frequency of such support, and of doubts expressed by poor parents about the amount of support they could expect from their children, which have been recorded even in societies with very strong traditions behind the idea that children should support their elderly parents. Among Indian peasants, for example, although 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" (J.C. Caldwell, Reddy, and P. Caldwell 1988). Similarly, in another Indian village it was found that while landowners generally felt secure in the belief that their sons would provide support for them during old age, poor men were pessimistic about their children's magnanimity (M. Vlassoff and C. Vlassoff 1980).

CULTURAL GROUP SELECTION. The manipulative view of signaling may be particularly helpful in providing a more plausible explanation of some of the behaviors that have inspired some people to propose theories of cultural group selection. For example, Campbell's "puzzles" of archaic city-state societies (Campbell 1991, 98–99) virtually disappear once we consider the role of signals in social manipulation. "Wasteful" royal funerals, which puzzle Campbell because they seem to run counter to the "commonsense, materialistic, calorie-counting, economic optimizing of modern sociobiology," suddenly make sense as ways for elites to communicate to their subjects that they are a different order of person with special relationships to the supernatural and therefore should not be challenged. Even more obvious is why the elites in all archaic city-states preached the value of "duty to the political organization and its customs," "duty of self-sacrificial military heroism in defense of the state," "within-group honesty," and "against self-interested deviations from duty" (Campbell 1991, 98).

Boyd and Richerson are less specific than Campbell about what sorts of behaviors they are trying to explain with cultural group selection, but the impression one gets from reading their work is that they believe that there are many human societies with complex forms of

cooperation that are motivated by neither coercion, nor concern for kin, nor concern for reputation and future benefits, nor individuals' considerations of their own immediate benefits. I am not familiar with any societies that fit this description. Until the development of, first, the state (i.e., a social system based on coercion [see Carneiro 1970]), and, second, a complex division of labor (i.e., a system of complex cooperation based on individuals' consideration of their own immediate benefits), societies were generally very small scale, and cooperation was based mainly on kinship and reciprocity, both direct and indirect. We do not need cultural group selection even to explain participation in warfare in such societies, given the high relatedness usually seen among combatants and the real material and reproductive benefits that have been shown to accrue to the victorious in warfare in traditional societies (e.g., Chagnon 1988a).

Cultural group selection clearly has happened in human history, but it is not clear that it has ever favored cultural traits that effectively encourage individuals to behave altruistically for the benefit of the group. For example, once large numbers of people are involved in systems of complex cooperation thanks to coercion or the development of a complex division of labor, it is quite possible that those societies will persist and spread at the expense of less well-organized societies. This is indeed a fair picture of human history since the development thousands of years ago of the state and the development during the past several hundred years of an economy in which most people gain their subsistence from an involvement in a complex division of labor.

But neither of these systems is based fundamentally on a system of moral rules that calls for individuals to sacrifice selflessly for the benefit of the group. While states may ask for such sacrifices, they back up their requests with imposed costs in the form of punishments for failures to support the state. Far from depending upon an ethic of self-sacrifice, the complex economy that started in northwestern Europe and has since spread throughout the world has been based on increased respect for individuals' rights and aspirations, the notion of self-reliance, and in some circles the idea that rewards from the supernatural will come not necessarily to those who sacrifice for the benefit of others, but rather to those who work hard for their own benefit (see Weber [1904–5] 1958).

This contrasts both with many traditional societies and recent attempts at socialism. Such societies tend to have moral rules that encourage individuals to sacrifice for group advantage, which may have the effect of discouraging the sorts of innovations that might be favored by cultural group selection.[3] The fact that both of these

kinds of societies have not fared well lately could be interpreted as support for this theory. The key to the relative success of both the state and the complex division of labor in persisting and spreading may be that both manage to harness the effort of large numbers of people not by demanding self-sacrifice, but by recognizing and taking advantage of the selfishness of human nature.

Although the theory of cultural group selection is usually described as being analogous to biological group selection, it may be closer in many ways to species selection or the broader phenomenon labeled clade selection (Stearns 1986). The word *clade* is derived from the Greek word for tree branch, and this helps explain its meaning. It refers to any group of organisms that are all descended from a common ancestor (Dawkins 1986, 259). Thus, a population, species, genus, family, or any other unit on the tree of life in which all the members are descended from a common ancestor is a clade. Species and other clades go extinct and reproduce; i.e., produce new clades, as in the process of speciation. The idea of clade selection is that if some clades are more successful than others in surviving and producing new clades, selection on the level of the clade will occur. Although even the critics of clade selection agree that it can and probably has occurred (see Dawkins 1982, 1986; Williams 1992), it cannot be used to explain any of the complex adaptations we see in organisms, because it operates not cumulatively, but in large, single steps. To explain organisms' complex adaptations, we can and must rely upon the usual models of microevolution. What clade selection may explain is the existence of some features of the broad picture of the evolution of organisms, such as the persistence of sexual reproduction, the widespread displacement of gymnosperm plants by angiosperms, or the tremendous success of passerine birds (Williams 1992).

Just as clade selection cannot be used to explain organisms' complex adaptations, cultural group selection cannot be used to explain the origins of complex social orders. Cultural group selection, for example, cannot explain the origins of the state or the origins of the complex division of labor of today's economy. Once these features are in place, however, cultural group selection may help us to understand why societies with these characteristics have tended to persist and spread at the expense of societies without them, and it is in explaining this sort of broad feature of human history that cultural group selection may prove useful. To explain the *origins* of such complex systems, however, we must as always focus our attention on the behaviors of individuals.

CONCLUSION

In combination, the various theories described here go a long way toward solving the evolutionary paradox of morality. The addition of some attention to the role of social manipulation in the production of moralistic statements is an important expansion of this perspective. The high level of theoretical development in this area has so far not been paralleled by empirical tests of any of these ideas. It is to be hoped that the evolutionary study of moral systems will soon include detailed analyses of the moral and ethical lives of people with a variety of different cultures.

NOTES

1. William Irons, Beth Leech, and Ruth Riegel made helpful comments on an early draft of this paper. Some of the ideas presented here were included in a paper entitled "Signals, Manipulation, and Biocultural Evolution" that I presented at a session entitled "Models of Biocultural Evolution: Understanding Human Social and Moral Development" at the 1993 annual meeting of the American Association for the Advancement of Science.

2. Thanks to Badcock (1986, 142-43) for pointing out this quote.

3. I do not wish to imply that all traditional societies have strongly altruistic ethics. Self-reliance and individual initiative are in fact encouraged in many traditional societies (e.g., Pospisil 1978).

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