

HOW DID MORALITY EVOLVE?

by *William Irons*

Abstract. This paper presents and criticizes Alexander's evolutionary theory of morality (1987). Earlier research, on which Alexander's theory is based, is also reviewed. The propensity to create moral systems evolved because it allowed ancestral humans to limit conflict within cooperating groups and thus form larger groups, which were advantageous because of intense between-group competition. Alexander sees moral codes as contractual, and the primary criticism of his theory is that moral codes are not completely contractual but also coercive. Ways of evaluating Alexander's theory as well as modified versions of it are discussed.

Keywords: evolutionary theory; human behavioral biology; morality; sociobiology.

In this paper I address the origin and continuing existence of morality from the point of view of biological evolution. By morality I mean (1) the near-universal propensity of individual human beings to make judgments of right and wrong and (2) the rules or systems of rules that codify and clarify these judgments. I see these two aspects as closely interrelated.

The first thing is something which all psychologically healthy human beings share. It consists of intuitive feelings that certain behaviors are correct, good, and deserving of reward and that certain other behaviors are incorrect, reprehensible, and deserving of punishment. These feelings are often very strong and play an important role in social life. Moreover, they underlie and support the widespread acceptance of codes of ethics, or sets of rules, that spell out the behaviors that are to be judged as right or wrong.

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The second aspect of morality, rules and codes of rules, is a broad category; it includes laws as well as other rules governing behavior. To some, morality is separate from law and is more a matter of a personal commitment to justice and caring for others. Such a notion of morality is often tied to religion. I have no quarrel with such a view. However, for purposes of exploring human behavior in evolutionary terms, I find it convenient to define a broad category that includes morals, laws, and other types of rules that are thought to be justified in some way by a notion of fairness or justice. I call this broad category *morality*. All of the various types of rules that fall in this category are based on notions of right and wrong, and all play an important role in shaping human societies.

I draw on both evolutionary theory and recent empirical research on human behavior to answer the question of the origin of morality. In the process—to paraphrase Philip Hefner (1989)—I press both areas of knowledge to the edge of their domains. In the end, however, I cannot provide definitive answers. What I *do* offer is an initial theoretical answer to this question that derives, for the most part, from Richard Alexander's recent book *The Biology of Moral Systems* (1987). Such an initial formulation has value for two reasons: because (1) formulations of this sort are the best one can do, given our current state of knowledge, and (2) initial theories can serve as very useful guides to future inquiry. The Alexander book is a thoroughgoing attempt to construct an evolutionary theory of morality based on the best biological knowledge available. It is rich in new ideas and will probably have a strong influence on attempts to understand ethics in evolutionary terms.

For completeness, I should note that there have been other recent attempts to develop an evolutionary theory of ethics and that Alexander's 1987 book draws on these. These other works include: Alexander 1978, 1979a, 1979b, 1982, 1985, 1986; Campbell 1975, 1979, 1983; Richards 1982, 1986a, 1986b; Ruse 1982, 1986a, 1986b; Ruse and Wilson 1985; Singer 1981; and Wilson 1978. Completeness also demands that I note that certain sections of Daly and Wilson's *Homicide* (1988a) contain ideas closely paralleling some elements of Alexander's theory of morality, even though the Daly and Wilson book does not explicitly address the evolution of morality in general. Especially relevant are chapters 10 and 11 of *Homicide*, which deal with revenge and blameworthiness.

THE NATURALISTIC FALLACY

Before beginning this discussion, I wish to emphasize the importance

of avoiding the naturalistic fallacy: the assumption that what is natural is good. As such, it is a violation of Hume's law, which states that one cannot derive moral normative statements from factual statements, or stated differently, that one cannot derive *ought* statements from *is* statements (Hume 1750). It is important to emphasize this point because people frequently assume that any attempt to address morality in evolutionary terms must include some argument to the effect that it is somehow morally good to do the things that we evolved to do. This is emphatically *not* what I argue in this paper.

Some forms of human behavior have been favored over thousands of generations by natural selection. As a result, selection has created in us a strong tendency to behave in these ways. These behaviors can be reasonably labeled *natural*. If we then argue that these behaviors are moral, we are led to the apparently reasonable conclusion that mother's love is natural. However, by the same reasoning we can also argue that infanticide is natural under certain circumstances. Evolutionary theory, together with the ethnographic record, supports the hypothesis that human mothers have a propensity to destroy, or abandon, their infants when they lack the resources to raise them or when the infants have a very low probability of surviving to be healthy, successful adults. Thus if we try to argue that what is natural is good, we become badly muddled. We become equally muddled if we define what is unnatural as immoral. We can classify behaviors that have not been favored by selection and did not occur in the environments of human evolution as unnatural. If we argue that these behaviors are therefore immoral, we are led to the conclusion that modern medicine and efforts to eliminate cruelty to animals are immoral.

The muddle becomes even greater if we stop to consider the ambivalence of our human commitment to ethical behavior. We are endowed with a set of conflicting motivations regarding moral rules. We are moved to make moral judgments and to protest when others commit what we perceive as immoral acts. We are especially prone to outrage when the immoral acts of others do us harm. At the same time, we are also endowed with a propensity to, under certain circumstances, behave immorally. For example, we protest when we catch others lying, yet we tell lies ourselves. Not only do we have a propensity to, on occasion, behave immorally, but also a capacity to feel guilty, in some circumstances, and to seek ways to correct our own actions. On other occasions, we display a capacity for self-deception that allows us, loudly and self-assuredly, to protest our innocence when we are in fact guilty. We sometimes admit to our

lies, at other times we are blind to them. We are complex, confusing, and confused creatures.

In evolutionary terms, one can argue that these conflicting tendencies are natural—in the sense that they are very much a part of our evolved human nature. They are displayed in all societies and all historic periods. One can convincingly argue that, to some degree, these conflicting tendencies—to make moral judgments and yet behave immorally—are visible in all individuals. They are also natural in the sense that the basic, underlying features of our psyches that lead us to behave in this way were reproductively advantageous in evolving human populations and have been favored over thousands of generations by natural selection. (This is essentially the view in Alexander 1979a and 1987.)

Given the above, we are forced to recognize that we cannot judge behaviors moral or immoral by evaluating their naturalness. Evidence indicating that a particular behavior is natural tells us nothing about its morality. Natural behaviors may be moral, immoral, or morally neutral. The same can be said of behaviors that are “unnatural,” in the sense that they run contrary to our evolved propensities and rarely occurred in the past. Such unnatural behaviors may also be moral, immoral, or neutral. We have to find criteria other than naturalness and unnaturalness for distinguishing moral from immoral.

We can agree, I’m sure, that many of the behaviors discussed below—homicide and rape, for example—are morally repugnant. Behavioral ecologists, in arguing that these behaviors are expectable products of evolution, are making *is* (that is, factual) statements. They are not making moral normative or *ought* statements. My personal conviction is that *is* statements are very useful to people who wish to improve human society. We can strive more effectively to make society what we think it ought to be if we have a better understanding of what it is (see Chagnon and Irons 1979b). This statement is true no matter how bleak the truth may be about what human society is and has been in the past.

It is perhaps worth noting that the above picture of human nature, derived from evolutionary theory, agrees in many ways with the Christian belief in original sin. I leave it to theologians to explore exactly how similar and how different these views are. However, I will add that it seems to me that part of the power of the belief in original sin stems from the fact that it portrays human beings as we actually experience them, that is, as having a potential for moral behavior combined with corruptibility.

HUMAN BEHAVIORAL ECOLOGY

The theory from which human behavioral ecologists approach morality is an extension of the modern Darwinian theory of evolution (Darwin 1858; Fisher 1930). This theory postulates natural selection as the sole driving force that gives long-term direction to evolution and, further, that by far the most important form of selection is differential individual reproduction, rather than differential reproduction of social groups or populations (Williams 1966). Dawkins's *The Selfish Gene* (1976, 1989) is an unusually clear presentation of this theory as an explanation of animal social behavior.

There is no consistent label for what I refer to as *human behavioral ecology*; rather, different authors use different labels. Other labels include *human sociobiology*, *neo-Darwinism*, *biocultural science*, *biosocial science*, *selection thinking*, and the awkward phrase *evolution and human behavior*. In many contexts, the theory itself is referred to simply as *evolutionary biology* or *evolutionary theory*, reflecting the fact that the theory used to explain human social behavior is no different than the theory used to explain such end products of evolution as the aerodynamic design of birds' wings or the camerallike design of vertebrate eyes.

The Basic Theory. According to evolutionary theory, animal behavior is strategic, in the sense that it has been designed to achieve a specific goal: reproduction. Natural selection, over many generations, has shaped the nervous and endocrine systems of animals in such a way as to cause them to generate behaviors leading to successful reproduction, or, in the technical language of evolutionary biology, to maximize inclusive fitness (Hamilton 1964). The human species, like any other animal species, has been shaped by these same evolutionary forces.

Maximization of inclusive fitness is an abstract and at times elusive concept (Grafen 1982; Hamilton 1963, 1964). It means that an organism behaves over a lifetime in such a way as to maximize the copies of its genes, or alleles, which by one route or another it projects into the gene pools of future generations. There are two routes by which an organism can project its genes into future generations. One is to bear and rear offspring (referred to as *direct reproduction*). The other is to aid genetic kin in such a way as to cause them to bear and rear offspring (referred to as *indirect reproduction*).

The importance of indirect reproduction was first clarified by W.D. Hamilton in his 1964 watershed article "The Genetical Evolution of Social Behaviour," in which he defined the concept of

inclusive fitness. He also defined a closely related idea that is sometimes labeled *Hamilton's rule* (1963, 1964), which says that when an organism faces a choice between reproducing directly or indirectly, natural selection will favor the choice that projects more of its genes into future gene pools. In doing this, an organism maximizes its inclusive fitness, which is defined as its individual effect on the reproduction of its own genes by both direct and indirect routes (Grafen 1982).

Actually, what is said to be a choice may be so only as a metaphor. For example, a gestating mammal may regulate her physiology in such a way as to increase the flow of nutrients to the offspring in her womb and, simultaneously, decrease the supply of nutrients for her own body. In other cases, the choice may involve neurological activity, which amounts to choice in a less metaphorical sense. This is true, for example, when a rat draws on information, stored in its memory, to choose the easiest path from its resting place to a source of food. What is meant by *choice* in this context is simply embarking on one of two or more possible actions that may consist of growth processes and other physiological processes, as well as neurological ones.

What kind of mechanism causes the organism to choose one action rather than another is not important in determining whether selection will act on the choice. It does not matter whether it is a neurological mechanism, a growth process, or whatever. What is important is whether the tendency to make the choice, one way or the other, is consistently passed on to offspring. If it is, then selection will act and favor the choice that leads to more reproduction. If the relevant elements of the environment remain stable long enough, most of the organisms in a population will come to have characteristics that cause them to choose the route to a higher rate of reproduction, whenever a choice is encountered.

Most ideas about the evolution of social behavior are derived from this assumption that selection will favor the choices (metaphorical or otherwise) that maximize the organism's reproduction of its genes, i.e., its inclusive fitness. Starting with this basic premise, general principles governing various choices are derived. These principles can then be applied to specific populations by deriving predictions and testing them through observation.

Lack's rule (1954) is an example of such a general principle. It deals with the choice organisms make between what Dawkins (1976, 1989) has called "child bearing" and "child caring." In order to reproduce directly, an organism does two things: it bears offspring and it nurtures, protects, and guides them after they are born. Both

activities use finite time and energy, and both involve risks. Superficially, it might seem that selection will always favor organisms that concentrate most of their limited time, energy, and ability to assume risks on the task of bearing offspring. However, selection does not reward the production of helpless infants, hatchlings, or whatever. Rather, it rewards the production of viable adults who will reproduce.

Getting helpless infants to the adult stage of life requires caring for them; and the greater the care, the higher the proportion of infants surviving to adulthood. However, effort and time put into child care cannot be put into child bearing. Thus organisms are faced with a choice as to how to apportion their limited time and resources. More child bearing means more offspring born but a lower proportion surviving; more child care means a higher proportion surviving, but fewer born. The balance that natural selection favors is the one that leads to the largest number of reproductive adult progeny (considerations of indirect reproduction aside). This balance, in terms of numbers, varies with the species's way of relating to its environment, its ecological niche. In some insects, the numbers of offspring produced in a short breeding season can be thousands. In elephants, chimpanzees, and human beings, reproduction may take the form of one offspring every several years, then many years nurturing that offspring.

In addition to Lack's rule and Hamilton's rule, theorists have developed a number of other principles that govern such choices as the apportionment of parental effort between the bearing and rearing of sons versus daughters, the choice of pursuing multiple mates or a long-term relationship with a single mate, what kind of mate to choose, and so forth. Many predictions about animal behavior, derived from evolutionary theory, have to do with the formation of cooperative social relationships and social groups.

Since natural selection favors individual organisms that strive to reproduce their own genes, cooperation among genetically distinct organisms is problematic. In sexually reproducing populations, no two individuals are genetically the same (cases such as identical twins in human beings aside). Thus organisms can often gain, in the reproduction of their genes, by denying food or mates to other organisms in the same population. The fact that selection is most powerful at the individual level, together with the fact that all individuals are genetically distinct in sexual populations, limits the evolution of aid-giving behavior. As a simple example, giving scarce food to another animal *costs* the giver, since it lowers his or her chances of surviving and eventually reproducing. The end result of

many such acts will be to diminish the animal's lifetime reproduction. At the same time, animals to whom food was given will reproduce more and will reproduce, not the aid giver's genes, but competing genes. Thus natural selection, under many conditions, does not favor costly aid giving.

There are conditions, however, under which selection *does* favor such altruistic aid giving. One is the condition first precisely defined by Hamilton (1964). As noted above in discussing Hamilton's rule, altruism is favored when the aid giver and receiver are genetically related, and when the benefit to the aid receiver is sufficiently greater than the cost to the altruist. Cost and benefits are measured here in terms of reproduction of the aid giver's genes. Another condition under which aid giving is favored by selection is when the giving makes reciprocation of aid by the receiver sufficiently probable and when the value of the reciprocated aid is greater than the cost of the aid given (Trivers 1971). This type of reproductively advantageous aid giving is called *reciprocal altruism* or *reciprocity*.

To the extent that animals evolve aid-giving behavior, it must be based on some special set of conditions such as those described above. The same can be said about restraints on selfish or competitive behavior. Again, to take the concrete example of scarce food: selection not only will favor *not* giving food under most conditions, but also will favor taking food *away* from another animal. Thus the formation of cooperative groups in animals is limited to situations where the group's members are genetically related or able to establish dependable relationships of reciprocity. Three categories of animals have evolved very large social groups: colonial invertebrates, social insects, and human beings (Wilson 1975). The first two categories have built their groups on genetic relatedness; the third group has done so on the basis of reciprocity.

The theory that I have summarized above has been evaluated extensively in studies of animal social behavior, and these studies (for the most part) support the theory (see, for example, Alcock 1989; Barash 1982; Brown 1975; Ghiselin 1974; Trivers 1985; Wilson 1975; Wittenberger 1981). Thus the ideas explained above are a well-supported theory of animal behavior, which is nothing other than a logical extension to social behavior of the same evolutionary theory that explains the evolution of body plans, growth patterns, and physiological processes. More recently, as will be discussed below, this theory has been extended to the human species.

Possible Intuitive Difficulties. Applying a theory of maximal reproduction to human beings strikes many people as absurd. Human

beings, after all, not only do not reproduce very rapidly, they even exert conscious efforts to limit their reproduction. This apparent absurdity, however, can be eliminated if a few things are pointed out, such as the fact that although organisms are selected to reproduce as fast as they can, this does not mean that they are all characterized by high birth rates. Something of why this is so should be clear from the description of Lack's rule. Reproduction consists of child bearing *and* child rearing, and one must be balanced against the other.

This issue can be further clarified by considering what is usually referred to as *environmental resistance*. Once any population of organisms has successfully adapted to an ecological niche and its population begins to expand, various forms of environmental resistance are encountered: scarcities of food, predators, parasites, and scarcities of nesting sites. Sometimes these forms of resistance to reproduction are labeled (following Darwin 1958) "hostile forces of nature." As the population increases, most forms of resistance become more severe, until further growth is curtailed.

In populations that face severe environmental resistance, the best strategy is often to produce few offspring and to expend great effort in nurturing each offspring (Pianka 1978). This makes it possible for each offspring to be highly competitive in coping with whatever form of environmental resistance is limiting growth (e.g., highly competitive in obtaining scarce food or nesting sites). Organisms that evolve to do this are said to be *K-selected*, and the slow reproduction of K-selected organisms does not violate the theory that organisms evolve to reproduce as rapidly as possible. Their slow rate of reproduction is the most rapid possible, given their way of relating to their environment and the environmental resistance they commonly encounter.

It is worth noting that for most sexually reproducing species (K-selected or otherwise), the average rate of successful reproduction is two offspring per parent, or simple replacement. (This average is for actual reproduction, not the potential maximum, which is usually much higher.) For such species, under commonly occurring conditions of environmental resistance, simple replacement is the best they can do.

Another reason why maximal reproduction seems absurd is our awareness that people often take conscious steps to limit their fertility. However, this is only an apparent contradiction of the above theory. Human beings, and other primates, are K-selected; and there is good evidence that we evolved to limit births by both conscious and unconscious means, in order to be certain of having sufficient resources for those few born and that, in environments like

those of evolution, such limiting of births *does* maximize successful offspring (Blurton Jones and Sibly 1978; Blurton Jones 1986). Modern behavior that carries this process of limiting births too far in evolutionary terms is historically recent and associated with novel environments (Irons 1979a, 1983; Lopreato and Yu 1988; Turke 1989; see also discussion below). Evolutionary theory predicts maximal reproduction only in environments to which a population has been able to adapt over many generations, and thus low reproductive rates in the very novel environments of modern society do not contradict this theory. It should be noted that, in line with the warning against the naturalistic fallacy, the suggestion that modern reproductive rates are far from evolutionarily optimal, in my view, has no moral implications whatsoever. (For an alternative view see Vining 1986.)

Evolution and Conscious Goals. It may help to put the above comments in perspective if we think about the relationship between conscious goals and the theoretical goal of maximizing inclusive fitness. It is possible to imagine an organism with a very large brain and a very simple conscious goal: to study and learn its environment as thoroughly as possible and then to use this knowledge to design and carry out a life course of action for maximizing its inclusive fitness. Such an organism would eat at regular intervals, not because it got hungry periodically but because its rational calculations told it that it must absorb a range of nutriments at regular intervals to maintain its body. Similarly, the pursuit of sex, offspring care, and other acts necessary for maximizing inclusive fitness would be a matter of rational planning in view of a very complete knowledge of itself and its environment. Such a creature might be able to tune its behavior in a very fine way to a large range of environments. However, it would pay a large price in time and other resources in learning, study, and rational planning before it would be able to act at all. Probably this explains why such a creature never evolved (see Humphrey 1976; Toates 1986).

Evolution has instead favored, in human beings and other animals, mechanisms that bring us to action more quickly and involve less in the way of understanding. For example, we eat because we are hungry, and we choose foods largely on the basis of what tastes good. Hunger and taste are physiological and psychological mechanisms that guide our actions without any knowledge of nutrition. We may have at our disposal scientifically gleaned data on our dietary needs, but this guides us relatively little in comparison to the less rational psychological mechanisms of hunger and taste.

For most of human evolution, our ancestors managed to eat enough of the right things while relying purely on these less rational mechanisms. The same can be said about our pursuits of social companionship, sex, prestige, child nurturing, and a host of other things, including morality. We pursue these objectives because of feelings, motivations, and emotions that define specific goals for us that we strive to accomplish, without awareness of such abstract concepts as inclusive fitness, genes, or evolution. Maximization of inclusive fitness is as far from our consciousness as was awareness by our Paleolithic ancestors of a need for a diet with a proper balance of carbohydrates, fats, proteins, vitamins, and minerals. The immediate things that we are aware of—hunger, taste, pleasure, pain, anger, compassion, moral outrage, satisfaction in the sight of a happy baby—are referred to in the technical language of evolutionary biology as *proximate mechanisms*. Even though the literature often discusses human beings and animals *as if* they were consciously and rationally pursuing a goal such as maximization of inclusive fitness, this is merely a convenient way of thinking about what is happening. In reality, animals and human beings are guided in their behavior by a host of proximate mechanisms of the sort described above. If this is kept in mind, it will be easier to understand what behavioral ecologists are saying about human beings.

Recent Theoretical Research on Humans. Since the middle of the 1960s a number of books and articles have explored and advocated the application of evolutionary theory to the study of human behavior. Notable among these are Alexander's 1974 article, "The Evolution of Social Behavior," and his *Darwinism and Human Affairs* (1979a); Chagnon and Irons's *Evolutionary Biology and Human Social Behavior* (1979a); Crawford, Smith, and Krebs's *Sociobiology and Psychology* (1987); Daly and Wilson's *Sex, Evolution and Behavior* (1978, 1983); Fox's article "The Cultural Animal" (1971); Lopreato's *Human Nature and Biocultural Evolution* (1984); Symons' *The Evolution of Human Sexuality* (1979); Tiger and Fox's article "The Zoological Perspective in Social Science" (1966) and their book *The Imperial Animal* (1971); van den Berghe's *Human Family Systems* (1979); the final chapter of Wilson's *Sociobiology: The New Synthesis* (1975) and his *On Human Nature* (1978). The theoretical perspectives advocated in these publications have been widely commented on in both the popular and scholarly press.

Also more recently, several theoretical books have appeared that attempt to shed light on human behavior and culture by combining the theory of biological evolution with a separate theory of cultural

evolution, or at least the idea that cultural evolution is best conceived of as separate, in some way, from the strivings of human beings as biological organisms (Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1981; chapter 11 of Dawkins 1976; and Lumsden and Wilson 1981). These later, coevolutionary theories all emphasize the idea that culture evolves to some extent separately from the biological evolution of human beings, and most emphasize that this separate process of cultural evolution readily creates behaviors that run contrary to the reproductive interests of individuals. These coevolutionary theories in effect are based on the assumption that, because of culture, the theory summarized above will not work for human beings as well as it has for animals.

The theory of morality discussed here is not based on one of the above coevolutionary views. Rather, it is based on the assumption that the evolution of the human capacity and propensity to absorb a culture was accompanied by the evolution of psychological mechanisms that tended, at least in the environments of evolution, to keep culturally influenced behavior directed toward reproductive goals (see Irons 1979b; Alexander 1979a; Symons 1979). Despite this, human behavior often fails to be biologically adaptive—that is, reproduction enhancing—for many reasons. For example, novel environmental conditions may render evolved mechanisms ineffective, or there may be coercion by other, more powerful human beings. However, in contrast to some of the coevolutionary theories above, it is not assumed that culture itself consistently leads people away from their reproductive goals. Rather, culture is something individuals use and manipulate in pursuit of the proximate goals that, in the environments of human evolution, were reproductively advantageous. Whether the view underlying Alexander's theory of morality or a more coevolutionary view is correct is a question for future empirical research.

Recent Empirical Research. Along with the theory in the above literature, a large body of empirical work has also appeared. The measure of any scientific theory is empirical evaluation, and the process of evaluating human behavioral ecology is well under way. This empirical work, in my opinion, has led to the following results: (1) the theory has received strong support, and (2) a number of interesting new facts about human behavior have been uncovered.

This research is summarized below under the following headings: Cultural and Reproductive Success, Nepotism, Parenting, Mating Strategies, and Aggression. Those wishing to read other summary treatments emphasizing empirical research should consult Gray

(1985), Borgerhoff Mulder (1987c, 1988d) or Betzig (1988). The summary below is concerned with empirical tests of evolutionary theory with data on human social behavior, not with theoretical discussions of how human behavior might reflect the influence of past selection. Thus the discussion below leaves out many important studies that are primarily theoretical. These latter studies are important in clarifying how empirical tests should be designed. However, the real payoff in terms of new knowledge comes only when theories are evaluated empirically and shown to be successful as predictive tools. I emphasize empirical evaluation because I wish to argue that the theory that serves as a background to Alexander (1987) has a strong empirical foundation.

Cultural and Reproductive Success. In all human societies there are culturally defined goals that people strive for. Common examples of such goals are wealth, status, and reputation. Exactly what is defined as worth striving for varies from society to society, but nevertheless culturally defined goals are conspicuous in any society. A straightforward prediction from selection thinking is that whatever is defined as worth striving for, in a particular society, should be a resource for reproductive success in that society. To the extent that the society in question represents an environment similar to the environments of human evolution, the prediction should be expected to be borne out. To the extent that the society in question represents an evolutionarily novel environment, the probability that this prediction will be successful is reduced. In more specific terms, the prediction is more likely to hold in the preliterate and prestate societies that have traditionally been the domain of study of anthropologists. In more modern societies, such as our own, the prediction is less likely to be confirmed.

This was first suggested as a general hypothesis in 1976, and since then a number of studies in traditional societies has supported the hypothesis (Irons 1976, 1979a, 1980; Barkow 1977; Borgerhoff Mulder 1987b, 1988b; Chagnon et al. 1979, 1982, 1988b; Cronk 1989c; Flinn 1986; Kaplan and Hill 1985; Turke and Betzig 1985). As the extreme novelty of modern environments would lead one to expect, the pattern is less consistent in more modern social settings. A pattern of translating wealth and status into reproduction has been found among nineteenth-century Mormons (Faux and Miller 1984; Mealey 1985), wealthy Americans (Essock-Vitale 1984), and the eighteenth-century population of Lancashire (Hughes 1986). On the other hand, such a pattern is not confirmed for the British peerage (Hill 1984) or the modern United States in general if academic

achievement and inclusion in *Who's Who in America* are used as criteria of success (Vining 1986; Essock-Vitale and McGuire 1988). Exactly how the evolved psychological features of human beings react to novel modern environments in such a way as to prevent the translation of wealth and status into reproductive success is an interesting theoretical question. This question has already become the focus of empirical work by behavioral ecologists (Turke 1989).

Nepotism. A very basic prediction of evolutionary theory is that human beings should be nepotistic (Alexander 1974): they should be more helpful and less competitive in dealing with relatives than with nonrelatives, and their willingness to be helpful with relatives should be greater the closer the genealogical links. This is a straightforward application of Hamilton (1964) to human beings. More than any other, this prediction has been extensively confirmed. Chagnon supplied the first dramatic confirmation of this prediction in his analysis of Yanomamo marriage and politics (Chagnon 1975, 1979a), and in his analysis, with Bugos, of a particular Yanomamo fight for which very detailed data were available (Chagnon and Bugos 1979). Hawkes (1977) supplied another early test of this prediction in her analysis of assistance in gardening among the Binumarien of Highland New Guinea. Other early tests of this prediction include Essock-Vitale and McGuire's analysis (1980) of nepotism and reciprocity, using data gathered in thirteen different social settings (including Hawkes's and Chagnon and Bugos's data). Since then, a large number of studies have evaluated, and for the most part, confirmed this basic prediction (Barkow 1982; Berte 1988; Chagnon 1980, 1981, 1982; Daly and Wilson 1982, 1987a, 1988a, 1988b; Faux and Miller 1984; Hames 1979, 1988; Hughes 1988; Hurd 1983; Irons 1986; Morgan 1979; Smith 1985; van den Berghe 1979; Weisner 1977).

Parenting. Closely related to the issue of nepotism in general is the issue of parenting. The most widespread form of kin altruism, or nepotism, among humans consists of the large amount of effort that people put into child rearing. Evolutionary theory makes a number of predictions about parenting. It predicts that organisms will evolve to invest in their own—not others'—offspring, and to invest more in those offspring that can be predicted to be successful reproductively. It also predicts that organisms will terminate their investment in particular offspring when the probable success of the organism is sufficiently low and the costs to self are sufficiently high. Logically, all of these predictions should apply to people, and a

number have been tested. The tests that have been published have focused on certain specific issues, such as the effect of paternity doubts on the paternal behavior of men and the occurrence of child abuse and neglect as an expression of an evolved propensity to avoid investing in others' children (e.g., stepchildren) or to terminate parental investment when resources for child rearing are lacking. An extensive (but not complete) list of the empirical studies on human parenting done from an evolutionary perspective would include Berte 1988; Blurton Jones 1986; Blurton Jones and Sibly 1978; Boone 1986, 1988; Borgerhoff Mulder 1988c; Borgerhoff Mulder and Milton 1985; Cronk 1989a, 1989b; Chagnon 1982; Chagnon, Flinn, and Malancor 1979; Daly and Wilson 1981, 1982, 1983, 1984, 1985, 1987b, 1988a, 1988b; Dickemann 1979a, 1979b, 1981; Draper and Harpending 1982; Essock-Vitale and McGuire 1985a; Flinn 1981, 1987, 1988; Gaulin and Schlegel 1980; Hames 1988; Hartung 1976, 1981, 1982, 1985; Hewlett 1986; Hill and Kaplan 1988a, 1988b; Lenington 1981; Lightcap et al. 1982; Mackey 1979, 1981, 1983, 1985, 1986; Seif 1990; Silk 1980, 1990; Turke 1985, 1988; Turke and Betzig 1986; Voland 1984, 1988.

Mating Strategies. Evolutionary theory has led a number of researchers to look at various forms of human behavior as mating strategies, that is, as ways of acquiring mates or achieving satisfactory mating relationships. Along with this, they have evaluated the hypothesis that human male-female differences can be explained, at least in part, by our species' history of polygyny. (The evidence indicates that, during most of human evolution, populations were mildly polygynous.) In the process of pursuing these lines of research, they have shed new light on some old topics, such as dowry and bridewealth (Dickemann 1979a, 1979b, 1981; Boone 1986, 1988; Borgerhoff Mulder 1987a, 1988a). They have also opened some unexpected lines of inquiry, for example, Cronk's analyses supporting the proposition that some instances of culture change can be seen as the outcome of individuals changing their mating strategies (1989a). In addition to the above studies, a partial list of empirical studies of human mating strategies and their concomitants would include Alexander et al. 1979; Borgerhoff Mulder 1985, 1989a, 1989b, 1989c; Brown and Hotra 1988; Buss 1985, 1987, 1988, 1989; Chagnon 1982, 1988a; Cronk 1989b; Draper and Harpending 1982; Flinn 1989; Fredlund 1985; Gaulin and Hoffman 1988; Hewlett 1988; Hill and Kaplan 1988; Hurd 1985; Kaplan and Hill 1988; Low 1988; Shepher 1971, 1983; Thornhill 1987; Thornhill and Thornhill 1987; van den Berghe 1980, 1983, 1987;

van den Berghe and Mesher 1980; Wolf 1966, 1968, 1970, 1976; Wolf and Huang 1980.

Aggression. A number of empirical studies have focused on various forms of aggressive behavior as expressions of conflicts of interest between competing individuals or groups. The topics studied include homicide (Daly and Wilson 1981, 1982, 1984, 1985, 1987a, 1987b, 1988a, 1988b; Chagnon 1975, 1979a, 1988b; Chagnon and Bugos 1979), rape (Shields and Shields 1983; Thornhill and Thornhill 1983), and war (Boone 1983, 1988; Chagnon 1975, 1979a, 1983, 1988b; Dow 1983). These studies, more than the others above, have engendered controversy. In my view, this controversy stems from a failure to appreciate the naturalistic fallacy, not from a weakness in these specific studies.

Accomplishments of Human Behavioral Ecology. The empirical work cited above supports a number of novel statements about human behavior. Some examples are the following: (a) in more traditional societies, wealth, status, prestige, and other goals people consciously strive for are resources that enhance reproduction; (b) people are everywhere nepotistic; (c) parental solicitude is lowered by paternity doubts and stepparenting; (d) parental solicitude is greatest for children with a high probability of reproductive success; (e) many social institutions, such as inheritance rules, dowry, and bridewealth, are in effect instruments for enhancing inclusive fitness; (f) many human forms of sexual dimorphism correspond to general cross-species patterns associated with polygyny. These statements are all sufficiently novel that they have not yet found their way into standard textbooks in anthropology, psychology, or other human sciences.

In the last decade and a half, what amounts to a new discipline has emerged. The researchers who created this discipline have come from a number of older, established disciplines, such as biology, psychology, and anthropology. Like any discipline, it has its limitations; at the same time, it has accomplished a great deal.

Let me also note that a fairly large literature has arisen that is vigorously opposed to human behavioral ecology, or as its opponents prefer to label it, *human sociobiology*: Ann Arbor Science for the People Editorial Collective 1977; Bock 1980; Kitcher 1985; Lewontin 1984; Lewontin, Rose, and Kamin 1984; Sahlins 1976. Because space does not allow a critique of this literature, two comments must suffice. First, most of this literature assumes that the propositions put forth by human behavioral ecologists are, in effect, *ought* statements. Usually this view is linked to the idea that sociobiology is an

ideological tool for preserving an oppressive status quo (see, e.g. Lewontin 1984; Lewontin, Rose, and Kamin 1984). This interpretation, in turn, relies heavily on the notion that all scholarly and scientific *is* statements are really *ought* statements and should be evaluated in terms of their supposed future political effects. Second, this literature by and large ignores the empirical research cited above. Kitcher (1985) is a partial exception; early in his book (pp. 8–10), he claims that he will examine the evidence for human sociobiology, and he *does* examine some empirical studies; however, he ignores roughly three-quarters of the empirical work available (compare his bibliography with that of Gray 1985).

It is a good sign that, more recently, two books have appeared that contain more balanced critical evaluations of human behavioral ecology: Gray's *Primate Sociobiology* (1985) and Hinde's *Individuals, Relationships, and Culture* (1987). These two books are scientific in orientation and free of the presumption that *is* statements should always be judged as *ought* statements.

Some New Directions for Future Research. The above research is, for the most part, conceptualized in terms of ultimate-cause reasoning. That is, theoretical models of what natural selection will favor are used to predict how organisms will behave, then observations are made to see whether actual behavior fits the predictions. Research of this sort does not inquire how the human nervous and endocrine systems manage to produce the behaviors that natural selection has favored. How do kin sentiments develop as an individual matures? How do these sentiments cause people to behave toward kin in ways that are consistent with Hamilton's rule? These are interesting questions that are not addressed by research of this variety. Recently, some researchers have begun to address these issues in evolutionary terms and thus to expand the field of inquiry (Alexander 1989; Cosmides and Tooby 1989; Symons 1979; Tooby and Cosmides 1989; Betzig 1989b). A fuller understanding of human behavior will no doubt be available once this line of research has produced a more detailed picture of the human psyche.

At the moment we can say relatively little about proximate mechanisms. We can say, as stated above, that the proximate mechanisms guiding behavior do not entail a cognition of such evolutionary goals as maximization of inclusive fitness, or even of reproductive success. Rather, we are motivated in terms of more immediate goals, seeking status, security, an adequate diet, mates, caring for children, and so forth. A useful concept to guide future research can be found in Cosmides' idea that we do not have a general ability to learn and

solve problems of all varieties but rather a number of distinct abilities, each of which deals with a specific domain of learning or type of problem solving (Cosmides 1985; Cosmides and Tooby 1987, 1989; Tooby and Cosmides 1989). Also useful is her view that each of these abilities can be conceptualized as a distinct algorithm that may in many ways be distinct from, and even contradictory of, other algorithms. These ideas have found support in her research on the Wason selection task. However, as things stand, we are a long way from having a complete map of the human psyche traced out from an evolutionary perspective.

A goal of future research is to be able to explain human behavior at two complementary levels (Betzig 1989b; Daly and Wilson 1983; Irons 1981a; cf. also Tinbergen 1963). One level is concerned with proximate mechanisms, acting in an individual's lifetime or in shorter time periods. The other is concerned with the effects of natural selection, favoring certain behaviors over many generations. Such a set of complementary explanations should be especially valuable in allowing better predictions of how human beings will behave in novel environments in which ultimate-cause models alone are less likely to be successful (Irons 1983; Turke 1989).

ALEXANDER'S THEORY OF MORALITY

In his recent book, *The Biology of Moral Systems*, R.D. Alexander (1987) presents a theory of the origin and maintenance of morality based on the evolutionary perspective discussed above. It is not the only possible evolutionary theory of morality, but it is a coherent theory, which in my opinion merits the attention of everyone seriously interested in morality and willing to entertain evolutionary explanations of human behavior. The theory can be summarized as follows.

1. *The primary hostile force of nature in human evolution has been other human beings; this hostile force has taken the form of group-group competition. Given the importance of group-group competition, there was an advantage to larger groups.* Often this form of intergroup competition would assume the form of warfare, although more subtle forms of competition would also be included. This assumption is, of course, difficult to test in a direct way with evidence from the Paleolithic period. However, there are numerous sources of indirect evidence. One can examine the prevalence of intergroup competition in historic and ethnographic societies, for example. If we use the Yanomamo as a model for evolving human societies, this assumption would be hard to escape. However, the question immediately becomes how

typical are the Yanomamo. I would say that the available evidence certainly suggests that violent intergroup aggression was a frequent hostile force for societies that have preserved their sovereignty (cf. Otterbein 1970; Jones 1988).

2. *The larger a group becomes, the harder it is to hold together because of internal conflict.* As explained above, evolutionary theory predicts that cooperative relationships can be maintained only if based on nepotism or reciprocity. There are severe limits on the size of groups that are held together by these mechanisms. Small groups can be held together by nepotism; somewhat larger groups can be established by combining nepotism with reciprocity. However, direct exchanges of costly aid between individuals, or between groups of close kin, require that each monitor the other and be alert to the possibility that aid will not be reciprocated in sufficient measure. At the same time, each party must be ready to take advantage of its partner by not reciprocating if circumstances indicate that is where the greatest payoff lies. The need for close monitoring, the dangers of being cheated, and the occasional outbreak of violent internal conflict as a result of cheating limit the size of groups that can be held together by direct exchanges of costly aid. The Yanomamo (Chagnon 1968, 1974, 1983) dramatically illustrate the difficulties of building large groups through reciprocity between close-kin groups.

3. *Morality was favored in human evolution because it allowed the formation of larger and better unified groups on the basis of indirect reciprocity. Moral systems are systems of indirect reciprocity.* Strategies of indirect reciprocity first evolved in communities in which people were able to observe the behavior of others in a wide range of contexts. This created a situation in which people's reputations—their widely perceived propensity to serve as effective and reliable aid givers—significantly influenced their ability to attract and hold allies. ("Allies," in this context, refers to individuals with whom a person would maintain long-term relationships of direct reciprocity.) It was important to attract and hold allies with whom one would exchange direct favors over a long period of time, and one's ability to attract such allies depended on one's reputation. Examples of such relationships in traditional societies would be individuals with whom one would establish marriage and political alliances, and with whom one could take refuge when faced with food scarcity in one's home territory (see, e.g., Bugos 1985; Chagnon 1983; Hart, Pilling, and Goodale 1988). Examples of equivalent relationships in modern industrial societies would include employer-employee, business partners, professional colleagues, spouses, and friends.

Thus reputation becomes important, and giving low-cost aid to all others—including those who could not reciprocate—became a form of reputation building. Such reputation building worked to the reproductive advantage of the indiscriminate aid giver through the attraction of allies. This strategy of indirect reciprocity, mediated by reputation, contrasts with strategies of kin altruism and direct reciprocity in that the aid giver need not pay attention to the characteristics of the aid receiver. All forms of evolved altruism must be discriminate in terms of costs and benefits. The benefits must outweigh the costs, and both must be measured in terms of the reproduction of the altruist's genes. For this to work, the kin altruist (or nepotist) must discriminate in terms of his or her relatedness to the aid receiver. In using strategies of direct reciprocity, the altruist must discriminate in terms of the aid receiver's ability and propensity to reciprocate. In using strategies of indirect reciprocity mediated by reputation, the altruist must discriminate in terms of the probability that third parties will seek one out as an ally as a result of the enhancement of reputation. This probability has more to do with the characteristics of the social group the altruist is operating in than with the characteristics of the aid receiver.

Reputation is important in all human societies and probably became important very early in the evolution of *Homo sapiens*, if not earlier in the hominid line. The importance of reputation made possible the development of systems of indirect reciprocity of the sort we know as moral systems. Such systems were able to limit the ways in which members of the same community who were not relatives and not direct reciprocators could damage each other's reproductive interests. Moral systems resolve conflicts of reproductive interest between individuals in ways that are "fair," which in this context means the resolution does not do too much harm to the interests of either party to the conflict. Alternatively, "fair" probably means that the cost of obeying the rules is less than the cost of either leaving the group or trying to negotiate new rules.

Within each community, those who had better-than-average reputations had an advantage. This meant that exhibiting more indiscriminate beneficence than average was advantageous, and thus people were motivated to outdo other members of their community in terms of this characteristic. This led, over time, to a temporal trend toward greater and greater indiscriminate beneficence. This trend is responsible for the widespread concern, in contemporary North American society, for the rights and welfare of those who cannot reciprocate—for example, the unborn, the irreversibly comatose, and animals.

4. *Because human social systems based on nepotism, direct reciprocity, and indirect reciprocity are very complex and difficult to manipulate to one's reproductive advantage, human beings evolved a number of psychological mechanisms for tracking their social environments. Among these psychological mechanisms was a sense of self-interest, a propensity toward self-deception (under certain conditions), a conscience, a sense of justice or of right and wrong, a self-image, and a sense of empathy with the thoughts and feelings of associates.* These features of the human psyche evolved as proximate mechanisms guiding behavior toward the service of reproductive interests; and these proximate mechanisms were necessary as means of tracking complex and subtle patterns of direct and indirect reciprocity. A persistent problem with the evolution of reciprocity is the danger that one will pay costs greater than the benefits received. This risk is especially high because of the advantages that can accrue to "cheaters," those who pay no (or little) cost but consistently enjoy large benefits from others' sacrifices. Much of the theory concerning the evolution of reciprocity, or reciprocal altruism, is concerned with how altruists can avoid being exploited by cheaters (Trivers 1971; Axelrod and Hamilton 1981). Equally important—in evolutionary terms—is being able to take advantage of opportunities to cheat. Thus the proximate mechanisms evolved to avoid being cheated and to cheat when it was advantageous to do so.

A feature of the human psyche that evolved to deal with this problem was a sense of self-interest, which consists of a tendency to evaluate social relations in terms of how they affect oneself and to try to establish relations that have a desirable effect. Whatever its origin, I see little reason to doubt that such a tendency is present in the overwhelming majority of human beings. It is also worth noting that a sense of self-interest need not be, and often is not, morally objectionable. It does not equate with selfishness, self-centeredness, or indifference to the welfare of others, traits that usually are contrary to self-interest because of their negative effect on reputation. The novel thing that evolutionary theory says about self-interest is that, in environments similar to those of human evolution, it tends to correspond to reproductive interests. The research reviewed above, under the heading Cultural and Reproductive Success, in effect supports this idea.

Complex patterns of direct and indirect reciprocity also created opportunities to cheat by being deceptive. One could appear to give more aid than one really did, or deceive others into believing they received more benefits than they really did, and so on. Deception of others is more effective if one deceives oneself as well (Alexander

1979a; Trivers 1971). Thus human beings developed a propensity to deceive themselves in certain ways. It is interesting to note that the Freudian concept of repression and the Marxist concept of false consciousness are also theories of self-deception. It is further interesting to note that we are all aware of instances of self-deception, on the part of others and occasionally on the part of ourselves. As with self-interest, what is novel in evolutionary theory is not the idea that we deceive ourselves at times, but the idea that we evolved to do so in the service of reproduction.

Another evolved feature of the human psyche is a self-image. We tend to evaluate our social environment and our own abilities, then use this information to construct an image of the person we want to be (see, Irons 1988, 310). Such a person must be one who will be successful in attracting allies; one who will have a good reputation. To some extent, we then tend to *become* that person, and to some extent we deceive ourselves into believing we *are* that person.

Other features of the human psyche include empathy, a sense of right and wrong, and a conscience. Because individuals had to judge the behavioral propensities of others accurately, they developed a sense of empathy, which among other things includes a sense of what others will see as their self-interest (cf. Symons 1979). It is only a small step to a sense of right and wrong and a conscience. Just actions are ones that help, or at least do not harm, the interests of others, and unjust actions are ones that harm the interests of others. This is the essence of the matter. Of course in reality it is often a matter of argument how far one can go in pursuing one's interests without violating the interests of another, and it is here that the rules that are negotiated among individuals come into play. Such rules define which actions in the pursuit of self-interest will be judged acceptable and which will be judged as doing too much damage to others and therefore wrong.

5. *Moral systems are contractual in character.* Alexander agrees with Rawls (1971) on this point. It does not matter to members of the group exactly what the rules are as long as each individual feels his or her interests are protected. However, once a set of rules is in place, people act with the expectation that those rules will be followed. Arbitrary changes can damage interests because plans were made and actions taken on the assumption that a particular set of rules was being followed. When moral rules change—whether by an explicit or implicit process—they do so by negotiation as each individual, or category of individuals, pushes for rules that protect their own interests. Compromises may be made as long as each

individual (or category of individuals) feels that the sacrifices they make are sufficiently compensated by the benefits they receive when others follow the new rules. Also, the transition to new rules needs to be done in such a way as not to harm individuals who took various actions, expecting the old rules to be in place. (This also can be a point for negotiation.)

CRITIQUE OF ALEXANDER'S THEORY

Alexander's theory does not paint a totally pleasant picture of the basic nature of human morality. It suggests that, along with a sense of morality, we developed tendencies to be immoral, when we can get away with it, and tendencies toward self-deception to hide our immorality. It further suggests that the ultimate function of morality, in past evolution and history, has been to enhance group advantage in competition with other groups, which intimates that building a pattern of worldwide morality will be difficult. However, there is no reason to think we can judge the correctness of a theory by whether it paints a picture that we find pleasing. In my view, the theory should be evaluated the same way that the other theories, discussed earlier, were evaluated: by deriving predictions and testing these predictions against fact. At the moment, explicit evaluation has not begun, although, as noted above, many of the premises on which the theory is built have been evaluated. Thus an urgent task for researchers should be to seek ways to test this theory empirically. This, however, is usually a slow process, and the task of evaluating a theory empirically and reexamining its logic usually go on simultaneously.

The Problem of Coercion. The simple statement that moral systems are contractual needs modification. Most moral rules are created by processes that entail coercion as well as negotiation. Further, most human beings are born into an ongoing culture that includes a moral system, and they are expected to learn and obey that system long before they are in a position to try to change it. Thus accepting such a system is more a matter of coercion than of contract. On the other hand, when moral rules are changed, it is people who change them. It therefore seems reasonable to assume that they usually try to change them in such a way as to serve their own interests. Thus it would seem that the contractual character of moral rules comes into play only when the rules are in a process of change. With some justice, one could argue that as long as one has the potential to change rules, not changing them is also a form of choice. Thus those who

choose to preserve the rules are, in a sense, exercising a choice as much as those who choose to change them. Either way, the rules can be said to be a kind of contract. However, the difficulty is that changing rules—or, more realistically, *trying* to change rules—is risky and costly, and not everyone has an equal chance of success.

Moral rules are contractual for individuals who have the power to change the rules if they wish—or at least the power to attempt to change them with some hope of success: the power, that is, to negotiate. For other individuals, moral rules are coercive—for the young, for women in many societies, and for those of low status (class, caste, estate, or whatever) in stratified societies.

In view of this, it seems reasonable to say that moral systems are partly contractual in character and partly coercive. In most societies, some individuals have more power than others to influence or coerce the actions of other people, so that those endowed with power can attempt to change the rules, and probably will, if they feel the rules do not serve their interests. For these individuals, the rules are more or less contractual in character. Individuals who have less power are not in a position to change the rules, and for them moral rules are more coercive in character.

The societies in which human morality evolved were probably egalitarian in character, as are, for example, the societies of the !Kung Bushman, Australian Aborigines, or simple horticulturalists such as the Yanomamo. In these societies, moral rules would have been contractual in a broader sense than in stratified societies, inasmuch as a higher proportion of the population would be in a position to initiate changes in the rules.

To place Alexander's theory in perspective, one must also note that about 5,000 years ago human populations in certain areas of the world developed the first states. This social institution—the state—has been more effective than morality in forming larger groups. However, it should be noted that the state rarely operates without reference to morality. Historically and ethnographically, the state (i.e., the agents of the state) defines obedience to its rules as a form of morality. In state societies, where there are laws as well as other types of moral rules, laws are similar to those other types of moral rules and often are rationalized in the same way. Many acts are defined as both illegal and immoral, in terms of the narrower definition of morality mentioned at the beginning of this paper. However, the difference lies in the states' position. If the state enforces a rule, it is law; if not, it is not law. Moral rules that are not legal rules are enforced in more subtle ways.

The Problem of Warfare. Another theoretical issue in need of clarification is the extent to which the competition that gave rise to morality took the form of warfare, as opposed to more subtle forms of competition. The reasoning in Alexander's theory is clear-cut and easy to understand when phrased in terms of warfare, but other forms of competition could have the same effect. For example, in some areas of the world foragers need to build large networks of allies, beyond their local group, so that they have someone to take refuge with temporarily, when food is scarce in their home region (Service 1971; Bugos 1985). One could conceive of differential success in building and maintaining such a network as a form of competition. In this subtle form, competition may have played a role in the evolution of morality. Ultimately, only empirical evidence can decide the issue, and (as noted above) indirect evidence is probably all that can be hoped for.

The Temporal Trend in Beneficence and Self-Image. Human societies differ in the importance they attach to nepotism, direct reciprocity, and indirect reciprocity. The temporal trend toward greater indiscriminate beneficence, described in the summary of Alexander's theory (point number 4), may be characteristic only of societies in which people rely on many reciprocal ties with nonrelatives. In these societies, advertising oneself as a good reciprocator is crucial. In other societies—the Yanomamo, for example—advertising oneself as indiscriminately beneficent may be taken as advertising oneself as a poor nepotist. How people choose best to present themselves—and how they choose actually to be—will differ from society to society and will reflect the attempt to build the types of alliances most crucial in that society. Aggressive defender of kin may be the best self-image and reputation among the Yanomamo, whereas indiscriminate altruist may be best in complex modern societies.

There are probably many ways in which the self-images people assume, and the types of reputation they strive for, reflect not only the mix of nepotism and direct and indirect reciprocity that is characteristic of their societies, but many other aspects of their cultural environment. Does one aid one's kin primarily by defending them in violent conflict, or by providing them with economic support? The reputations people strive for will indicate the answers to questions of this sort.

Alexander's exploration of self-image as a mechanism for dealing with indirect reciprocity can be greatly expanded. Many moral rules may appear not to relate clearly to a conflict of interest. For example, how does the prohibition of pork among Muslims relate to conflicts

of interest among members of Muslim communities? The answer may lie in the fact that obeying such apparently arbitrary rules is a way of identifying oneself with a particular group (see Irwin 1987) and of advertising oneself as a loyal member of that group. Many rules that appear irrational to members of Western societies may have as their purpose some form of self-advertising. This can be a matter of advertising group membership or a quality that is especially valuable to one's group. Different societies make very different demands on individuals, and thus self-images and the accompanying self-advertisements vary greatly among societies.

An Example: "Negotiating" New Rules. The ideas discussed above may be difficult to understand in the abstract. What does it mean to say that people are sensitive to whether moral rules serve their self-interest, or that they sometimes negotiate new rules? Let me clarify this point with an anthropological example from an egalitarian society.

Eric Fredlund (1982), a student of Napoleon Chagnon's, studied a group of Indians in southern Venezuela known as the Shitari Yanomamo, and in a dissertation he recorded examples of negotiating new rules in a preliterate, egalitarian society. The Shitari, like all Yanomamo, live in small villages that tend to consist of two intermarrying descent groups or lineages. (See Chagnon 1983 for a full description of Yanomamo society.) These descent groups are exogamous; that is, men cannot marry women belonging to their own groups. Instead they must seek wives from other groups, usually other descent groups in their own villages. They seek wives as a rule within their own villages because relations between villages are usually characterized by mistrust or open hostility. Although men cannot marry women of their own lineage, they have a right to arrange the marriages of these women. In practice, marriages are usually arranged by the woman's close male relatives, who are members of her lineage (primarily by her father and brothers, although all men of her descent group may have something to say about the matter). Agreements to bestow women are usually accompanied by an expectation of reciprocation; thus two lineages in a village reciprocate by supplying each other with wives. Among the Yanomamo, men seeking wives are usually more numerous than available unmarried women. Polygyny is the most obvious reason for this; a male bias in sex ratios is another.

All of this is typical of the Yanomamo everywhere. What is different about the Shitari is that their villages are, on average, much smaller than villages among the other Yanomamo. This means that

the local-descent groups in each village are very small; thus individual Shitari have a small number of potential mates since, for the most part, they must find a mate in other descent groups of their own village. The pool of potential mates is further limited by the fact that only members of the other lineage who are of the same generation as the male can be legitimate spouses. Because this is a very small group indeed, the pool often turns out (by chance) to be either mostly male or mostly female. This is a straightforward result of the fact that each generation of each descent group is the equivalent of a small sample from a large universe that is approximately 50 percent female and 50 percent male. As a consequence, there is a high variance in the number of potential mates available to Shitari men. For many Shitari men, there is no legitimate potential mate in their village. At the same time, because of the same sampling phenomenon, the men of the other local-descent group in the village often have enough potential spouses, or even a surplus (see Cronk 1988; Irons 1981b). The situation is less problematic for women because, as noted, potential wives are scarcer than potential husbands.

Among the Shitari, the men who are left out in the cold (so to speak) often resort to force and seize a woman of their own group as a wife, thereby violating a basic and important moral rule of Yanomamo society. The Yanomamo describe this infraction as incest, even though the woman is usually genealogically distant from the man who took her by force. The usual response to this sort of incest is that other men of the village—especially young men who have lost a potential wife as a result of an illegitimate marriage—are outraged and challenge the culprit to a club fight. If the offender stands his ground and is willing to take on all who challenge him, he may be able to keep the wife he took by force, in which case he behaves in ways that imply his wife is a legitimate spouse; that is, he behaves as if she is a member of a descent group other than his own.

The primary way in which descent-group membership is made clear in Yanomamo society is by kinship terms. A man refers to women of his own lineage and generation as “sisters,” and to women of his own generation in the other descent group of the village as “wives” (whether he is married to them or not). In this situation, the man who seizes a wife calls her “wife” instead of “sister.” Similarly, he changes the terms he applies to her close relatives in such a way as to imply that they are members of a different lineage. In general, he behaves toward them in ways that are appropriate for members of other descent groups. His close relatives follow his example in the use of kin terms, and in other ways behave toward

his wife and her close kin in a manner that implies they were members of a different lineage. Eventually, they deny the existence of the genealogical bond that once linked them together in one lineage. In effect, they change the record of who belongs to what group and who can marry whom, and in the process they create two lineages where there was only one. Also, they provide potential wives for several men who had no, or few, prospective wives.

One way to interpret events of this sort is that they are an awkward way of renegotiating the rules. Several things can be observed about this renegotiation, however. Those who take the risk of challenging the old rules are those who are treated most “unfairly” by the old rules. Those who are most outraged are those who stand to lose the most by rewriting the rules. The extent to which the rules are rewritten is minimal—just enough to solve the problem a few men have in finding spouses. One could imagine a young Yanomamo man challenging the whole idea of descent-group exogamy as a way of solving his problem, but this would trample on the accepted rights of more people and hence carry a greater risk of failure.

One might ask, Why break the rules and then rewrite them? Why not rewrite the rules first? Chagnon (1983, 1988a) provides the answers.

What I have described above are extreme cases of Yanomamo reacting to rules that thwart them in serious ways. In many other situations, Yanomamo *do* rewrite the rules first. For example, Chagnon tells of a man who began calling two of his sister’s children “wife,” instead of the appropriate term, while they were small girls; and he persisted in this until they grew up, at which point he married them. Thus the Yanomamo are continually engaged in a subtle manipulation of kin terms, and most of this manipulation consists of men moving women from unmarriageable to marriageable categories (Chagnon 1988a). It appears that, although desperate Shitari Yanomamo may break the rules, then work to justify their action by changing the rules, many Yanomamo are continually, quietly, and subtly rewriting the rules in anticipation of marriages. This too can be seen as a form of renegotiation of rules that fits Alexander’s theory of morality.

Awkward as the events described above are, I suggest that they are examples of renegotiating the contract that underlies a particular moral rule. Renegotiation of this sort keeps moral rules from becoming too unfair. For most human societies, this needs to be qualified by saying that the rules are kept from becoming too unfair to individuals with power to renegotiate the rules. Young men who are able to accept the challenge of a club fight are individuals with such

power in Yanomamo society. Others with less power may not be as successful at negotiating new rules.

In complex literate societies we are much more used to the idea that rules are to be periodically rewritten. We have legislative bodies, political parties, lobbying organizations, and a host of settings in which we can argue that the rules of our society need to be changed. In line with Alexander's theory of morality, I suggest that this process of renegotiating rules goes on in all societies and is always driven by the same motives. People are motivated both by self-interest and proximate feelings about what is fair or just. Fairness, again, has to do with resolving conflicts of interest between individuals or groups of individuals. When a conflict is resolved by compromise, in such a way that neither party loses too much, it is fair. Thus negotiated rules are ways of resolving conflicts fairly. In cases in which conflict is resolved by force, the resolution is less likely to be perceived as fair by the defeated party. Rules established by force are less likely to seem fair, but even here people may be coerced into saying such rules are fair, and may, in some cases, actually come to believe they are fair.

Many rules are generated by processes that involve negotiation *and* coercion, and in these instances perceptions of justice versus injustice are likely to shift as the balance of power between groups changes. Those who are disadvantaged by such rules are likely to perceive them as unjust when they have the power to change them, and to accept them as just when they do not.

Empirical Evaluation. What tests can be suggested to evaluate Alexander's theory? I will suggest only a few, merely to illustrate the type of empirical research I see as useful for evaluating a theory of this sort.

1. Moral rules as well as formal laws tend to serve the interests of those in power, and not the interests of those who lack power. In stratified societies, this prediction can be easily tested where clear-cut differences in power can easily be identified. I suggest that the data presented in Betzig (1986) already provide a confirming test of this prediction, even though the study does not explicitly address this hypothesis.

I might also add that this prediction (and much of the discussion above) has a Machiavellian tinge; thus I emphasize that this prediction is an *is*, not an *ought*, statement. I am not saying that moral rules and laws *should* serve the interests of the powerful more than the interests of the powerless; I am only saying that if the above extension of Alexander's theory is correct, they *probably will*. How

one might strive for a better set of rules or a more equitable distribution of power are also legitimate questions. I would hope that widespread confirmation of the above predictions would make people more eager to seek ways to correct what seems, in terms of our proximate feelings of justice, to be a problem.

2. Groups with clear-cut external enemies will have more of a consensus on rules, and there will be fewer attempts to circumvent them. This is a straightforward prediction that could be tested both by cross-cultural comparisons and by examining changes in a society as external threats wax and wane.

3. Changes of rules will generally occur for one of two broad categories of reasons: (a) the distribution of power has shifted so that groups who were formerly in a weak bargaining position are newly in a position to negotiate (or agitate) for rules more favorable to their interests; (b) the circumstances of the society in question will have changed so that the way formerly-laid-down rules affect the interest of various groups or categories of individuals will have changed. This will be more likely to create pressure for change if the new circumstances make the rules less useful in terms of the interests of powerful groups or individuals.

4. When changes occur, there will be (in most cases) conflict among different groups, or categories of individuals, over what the new rules should be. Each group will tend to propose and agitate for rules that serve its own interests best.

5. The types of reputations people strive for should reflect the mix of strategies conducive to success in their society. For example, the fierceness of the Yanomamo should be found in societies in which men achieve success primarily by defending themselves and their kin in violent encounters. The generalized beneficence of modern societies should be characteristic of societies in which indirect reciprocity is very important and nepotism relatively unimportant. Each society's ideal person should be the kind of person who is most valuable as an ally in that society.

It may seem that choice, and hence reputation, is not relevant to nepotism; we can choose our friends but not our relatives. However, this is not completely true, as one can sometimes choose which of two relatives to cooperate with more closely. Even more important, when people choose mates, they are choosing relatives for their children. Mate choices are certainly among the most important choices people make in any society. A potential mate's qualities as a nepotist can be very important criteria for guiding such choices.

All of the above predictions could be tested with cross-cultural data or by the careful examination of individual societies. Evaluation of

Alexander's theory of morality will require many such tests with independent bodies of data.

What Is Moral and Immoral? Alexander's theory of morality and the suggested modifications, which are a series of *is* statements, consist of a set of theoretical statements as to how morality came into existence and some discussion of the process by which moral rules are modified over time. It is interesting, as a final note, to ask if we can use this theory to derive *ought* statements. If we accept Alexander's view, which follows Rawls, the answer would be that, as individuals, we cannot. Moral rules are contracts that are arrived at by negotiation, and all we can do as individuals is to participate in the process of negotiation. Understanding the theory will not, in a direct way, alter this process, although it might make our participation more sophisticated. If we accept the modified view that incorporates coercion, the answer is only slightly different. We can participate in negotiating new rules, or if, because of position, we have the power to coerce, we may use that power to create new rules. Either way, the answer is basically the same, since there are always limits to such power. Moral systems are produced by historical processes that we can influence but cannot, as individuals, fully control. We all participated in these processes before we were exposed to the above ideas and we will, in all probability, continue to do so in much the same way in the future.

I suggest the following, however. A frank admission that conflicts of interest are inevitable and that compromises are necessary may soften the harsher aspects of debates over moral issues. Also, it may help if we recognize that moral rules are human creations. When we debate moral issues, we are not so much trying to discover an objective reality (see Ruse 1986b) as trying to agree on a set of rules that all can accept. However, accepting this will be difficult for those who are convinced that morality is not a human product but is created by a higher authority.

Saying that moral rules are human products seems dangerous to some individuals—as if it were equivalent to saying that any arbitrary rule that people can be beguiled into accepting is as good as any other. However, this fear is not well grounded, inasmuch as moral rules are contractual in character. Nor is what people perceive as their self-interest completely flexible. The self-interests of participants in the making of rules put limits on the kind of rules that will be accepted by everyone. Some rules will have a better chance than others of being seen as just over a long period of time. These, I am willing to argue, are rules that allow each category of individuals

to pursue what they perceive as their own self-interest while doing as little damage as possible to the interests of others.

This is, of course, sidestepping the issue of coercion. However, one can argue that coercive rules are less satisfactory to those affected by them, and as a result less stable over time. Coercion is a historical and social reality, but it may be possible to argue that cooperation is more extensive and stable over time when it is based more on contract and less on coercion. Such issues can be subjected to empirical evaluation, and evaluating them may make future negotiating rules more efficient and less hostile.

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