# The Cultural Evolution of Beneficent Norms

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## Abstract

*Sociobiologists claim that genes which code for altruistic acts toward close genetic kin can overcome selection pressures favoring self-interested behaviors. This article argues that similar processes may operate in the cultural sphere. Specifically, rules that mandate beneficent acts toward people with a higher than average probability of carrying the same rule may proliferate without sanctions, even when those acts are costly to the actor. One class of rules directs beneficent behavior toward close cultural relatives, including cultural ancestors, descendants, siblings, and cousins. Another class directs beneficent behavior toward those who exhibit particular cultural markers. For several reasons, such rules may lead to larger sets of mutual altruists than those produced by genetic processes.*

There is much disagreement about the prevalence and importance of human altruistic behavior. On the one hand, adherents of rational choice theory generally claim that human social behavior is best explained by assuming that people act to maximize their own self-interest (e.g., Coleman 1990; Hechter 1987). In this framework, altruistic behavior is either nonexistent or relatively unimportant. On the other hand, there are many who claim that altruistic behavior not only exists but is relatively common (e.g., Etzioni 1988); or even if uncommon, that altruism may have important social consequences (R. Hardin 1982).

There is, in fact, much evidence that people often sacrifice their own interests for the benefit of others (Etzioni 1988; Piliavin & Charng 1990), but that evidence is not convincing to skeptics. It is usually possible to come up with an interpretation of the behavior that is consistent with the direct promotion of long-term self-interest, or with self-interest mechanisms that have "gone astray" in some way. And since the maximization of self-interest is widely thought of as the simpler or more theoretically compelling hypothesis, there is a strong temptation to reject the altruistic account. Thus, the evidence might be more persuasive if there were sound theoretical reasons for expecting people to be altruistic.

## The Selection Problem

It is not very difficult to devise proximate explanations for human altruism. The social psychological literature is replete with developmental and social learning theories attempting to account for altruistic behavior, and there is a large body of experimental and nonexperimental evidence bearing upon those theories. The fact is that people *can* be taught to give away resources or expose themselves to threat in order to benefit others, even when there are no external rewards for doing so. Researchers have gathered substantial information about the factors influencing such behavior, although there is undoubtedly much that is yet to be learned (Piliavin & Charng 1990).

The unanswered question, therefore, is not "Why would anyone act contrary to self-interest?" but rather "Why does such behavior persist and reproduce itself over long stretches of time?" What makes this question so puzzling is that there appear to be powerful evolutionary forces that select against altruistic behavior. Suppose, for the moment, that we follow socio-biologists in defining altruism as behavior that reduces the reproductive fitness of the donor while increasing the reproductive fitness of the recipient, where reproductive fitness is the expected number of offspring that survive to adulthood (Trivers 1985). That definition in itself implies that genetically controlled altruistic behavior should be subject to strong negative pressures from the forces of natural selection. (The evolutionary process does not look kindly on behaviors that reduce reproductive fitness.) Put another way, indiscriminate altruism is not an evolutionarily stable strategy (Maynard Smith 1975). That is, a population of altruists can easily be "invaded" by nonaltruists (free riders) who enjoy the benefits of others' altruism without reciprocation. Consequently, nonaltruists should proliferate at the expense of the altruists (Dawkins 1976).

The stock answer of social scientists, of course, is that cultural factors can overcome genetic pressures against altruism (Campbell 1975; Sahlins 1976). But that answer ignores the fact that there should also be strong selection pressures against cultural determinants of altruism. Consider, for example, a norm that says "Donate 20 percent of your income anonymously to charitable causes." Regardless of how many other people adhere to the norm, those who adhere will be worse off, in several respects, than those who do not. If times are bad, the adherents will probably have fewer surviving children and those children will have fewer resources. Assuming that a large portion of cultural transmission is from parents to children, that implies fewer potential adopters of the altruistic norm. Even if times are good, the adherents themselves will have fewer resources—resources that could have been invested in teaching the norm to others. And because they have fewer resources, they will be less attractive as models for the imitation of others. Consequently, the proportion of people who adhere to the norm should get smaller in each successive generation.[1]

Thus, even if people can learn to be unselfish, they are even more likely to learn to be selfish. For altruism to persist, there must be some process or processes that act in opposition to these negative selection pressures.

## The Kinship Theory

Sociobiologists claim to have found such a mechanism (Hamilton 1964). The kinship theory, which is almost universally accepted among biologists, is based on the fact that close kin are more likely than other organisms to share the same genes. Thus, if person X possesses a rare gene for altruistic behavior, there is a 50% chance that any given child of X also possesses that gene.[2] There is also a 50% chance that X's sibling possesses the gene, a 25% chance that X's uncle possesses the gene, and so on. If X performs an altruistic act toward one of these close relatives, it will reduce his own reproductive fitness but it will also increase the fitness of the relative, who has a good chance of carrying the same altruistic gene. Specifically, suppose that there is a gene which says, in effect, "Perform an altruistic act whenever $Br > C$," where $r$ is the coefficient of relatedness (the probability that recipient and donor share the same gene by common descent), $B$ is the benefit (in reproductive fitness) to the recipient, and $C$ is the cost to the donor (also in reproductive fitness). It has been shown that, on the average, such acts increase the relative frequency of altruistic genes in each successive generation (Hamilton 1964).[3]

The theory may be summarized by saying that natural selection favors behaviors that maximize *inclusive fitness*—the sum of one's own offspring and the offspring of relatives, each weighted by the coefficient of relatedness. Thus, acts that are altruistic from the point of view of the individual organism are selfish from the perspective of gene survival, which is what drives the evolutionary process. Note, however, that because the probability of sharing altruistic genes decreases by half with each degree of kinship distance, the theory has a hard time explaining altruistic behavior among distant kin. Even first cousins have a relatedness coefficient of only .125, implying that the benefit to the recipient must be at least eight times as large as the cost to the donor in order for the act to promote gene survival. And altruistic behavior toward nonkin has no place in this theory.

Seemingly altruistic behavior toward nonkin *can* be explained by the theory of reciprocity (Alexander 1987; Axelrod 1984; Trivers 1971). The essential idea is that behaviors that are altruistic in the short-run can be explained by self-interest if they tend to induce long-run reciprocal helping behavior. The problem is to specify the conditions under which such reciprocal cooperation is likely to emerge. In recent years, reciprocity has become an extremely active research area involving both elaborate mathematical theories (Hollander 1990) and randomized experiments (Kollock 1991). Despite the success of this approach, it seems implausible that *all* beneficent behavior toward nonkin can be explained by reciprocity. One reason is that we routinely observe beneficent behavior toward people who are incapable of reciprocating in any substantial way. Another problem is that reciprocity theory has not been very successful in explaining contributions to groups rather than to individuals (Boyd & Richerson 1988).[4]

## Cultural Mechanisms

The key insight of the kinship theory is that any assessment of the selection pressures on altruistic behavior must attend to the consequences to the recipient. Self-sacrificing behavior that is differentially directed toward other organisms that are likely to propagate the same behavior may experience positive selection pressures. In this article I shall apply that idea to cultural determinants of altruism.

Although culture encompasses a great many things that can be passed from one person to another (Kroeber & Kluckhohn 1952), I restrict my attention here to the transmission of norms, for two reasons. First, the aim is to explain altruistic behavior, and norms specify behavior much more directly than other cultural elements. Second, as we shall see, norms can be described at a relatively high level of generality, with logical relationships among different classes. This type of analysis is more difficult to perform with beliefs, values, or artifacts. Furthermore, although beliefs and values may be important to altruistic behavior, much of that importance stems from their support of norms. Nevertheless, some of the mechanisms I shall describe here might also work for beliefs and values.

Now it is common in sociology to define norms as shared expectations for behavior that are maintained by sanctions (Homans 1950). Unfortunately, there is minimal understanding of how it is that people's behavioral expectations come to be shared. Clearly, the core of any norm is a rule, by which I mean simply a specification of behavior that is learned from other people. Typically, a rule will have the contingent form "If conditions are A, then do B." When a rule becomes universally adopted within a group (or almost so), we say that the rule has become a norm.[5]

Within any given population, we often find competing rules governing similar situations. Voting, for example, is a behavior that has been a persistent anomaly for rational choice theory. There are many people who have apparently adopted a rule to vote in every election. Some follow a rule to always vote in general elections but not in primaries. Others vote when it is convenient, but not otherwise. Still others never vote. From an evolutionary point of view, the relevant questions are (1) how do the relative frequencies of these rules change over time and (2) why is it that some rules are more successfully transmitted than others?

Sociological theories of norms tend to treat the content of rules as arbitrary, and instead focus on those processes like socialization and sanctioning that are common across groups. An essential feature of my argument, however, is that the content of a rule may be a major factor in determining how the proportion of adherents changes over time. I claimed earlier, for example, that a rule which says "Donate 20% of your income anonymously to charitable causes" should be subject to negative selection pressures. And more generally, any rule requiring beneficent behavior should have some negative selection pressures. Now, I want to argue that *some* beneficent rules should also have positive selection pressures that may, if conditions are favorable, exceed the negative pressures. When this occurs, the rule may come to predominate in a population without necessarily being supported by sanctions.

Before going further, there is clearly a need to say more about the precise meaning of the term *altruism*. Unfortunately, there is minimal agreement among social scientists on how *altruism* should be defined. For any definition, moreover, it is usually not difficult to find examples that fit the definition, yet contradict common-sense notions of altruism. To avoid these difficulties, I shall instead focus on what I call "beneficent rules." These are rules that mandate behavior that, on average, improves the welfare of the recipient. By welfare I mean objective criteria that are widely regarded as resources or valuable states. Certainly wealth, prestige, and power fall within that definition, but one would also want to include health, life-span, and freedom of expression.

Notice, however, that this definition says nothing about the consequences for the donor. Adhering to a beneficent rule necessarily entails some costs to the donor, but may also yield benefits. If the costs are substantial relative to the rewards, the negative selection pressures described earlier may predominate. But the aim here is to show that some beneficent rules are subject to positive selection pressures that derive from the consequences to the recipient, regardless of what happens to the donor. If these positive pressures exceed the negative pressures, the rule may proliferate until either it is universally adopted in the population (i.e., it becomes a norm) or reaches some other stable equilibrium point. This can happen even when, for the donor, the costs exceed the rewards.

## A General Rule

I now propose a quite general class of beneficent rules that generate positive selection pressures because of their consequences for recipients. This class may be formulated as follows:

Be good to those who have a higher than average probability of being carriers of this norm.

I use "be good" as a shorthand for "perform a beneficent act under specified conditions."[6] The act and the conditions might be something like "If person X loses his job, offer to loan him some money." While those specifics are naturally of great interest, in this article I shall be primarily concerned with the question of who shall benefit. Several classes of appropriate beneficiaries will be considered. But first, let us examine the positive selection mechanisms that might operate on a rule of this sort.

The most general selection mechanism, which is a cultural analog to the genetic kinship theory discussed earlier, depends on the following principle: Any improvement in a person's welfare will increase the likelihood that he or she will transmit rules to other people. To explain this, I shall briefly sketch a theory of rule transmission. Rules are transmitted from one person to another either through imitation (the passive mode) or teaching (the active mode). Imitation is arguably the more elementary process. In fact, there is reason to believe that people have a genetic predisposition to imitate rules that are commonly observed in their immediate environments (Boyd & Richerson 1985; Lopreato 1984). The evolutionary rationale is that behaviors that are common in

a given environment have a good chance of being the most adaptive behaviors for that environment. Imitation is much less costly than trial and error as a way to acquire these adaptive behaviors.

Imitation may be ubiquitous but it is not indiscriminate. People imitate selectively, and there are principles of selection that have an obvious plausibility in terms of evolutionary adaptiveness. For example, "Imitate those whose physical and social environment is most like yours" and "Imitate those who have been in the environment longest." But the selection principle that is central to the propagation of beneficent norms is "Imitate those who are most success-ful," where success refers to all those things that I previously classified as welfare: wealth, power, prestige and other widely shared desiderata.

The evolutionary advantage of imitating successful people should be so strong that it may very well be genetically programmed. But that is an open question that is not crucial to my argument; as long as it is a nearly universal tendency, the outcome will be the same. I also want to emphasize that when people follow this selection principle, they are not necessarily engaging in a conscious cost-benefit analysis leading them to conclude that if they imitate successful people, they will themselves be successful. Rather, I suspect that people usually imitate norms without an awareness of having done so, or without being able to reconstruct their reasons for doing so.

An important characteristic of this selection principle is that, although it is selective with respect to persons, it is not very selective with respect to behaviors. People's behavioral repertoires are very complex, and we typically have minimal basis for judging which of a successful person's behaviors were instrumental in producing success. Imitating all of them may very well make us more successful, but in the process we may adopt many behaviors that we would be better off without. Suppose, for example, that the more successful people in my social circle are Freemasons. That may motivate me to become a Freemason but, of course, the correlation between success and Freemasonry may not be a causal one. And even if it is, there are surely many behavioral components of Freemasonry that are either irrelevant or detrimental to my own welfare.

That brings us to the core of the argument. Suppose person A follows a beneficent rule that directs him to help B. The help that B receives makes him more "successful" than in the absence of that help. Consequently, B will be a more attractive model for imitation, and any rules that B has adopted are more likely to be adopted by others. If B has a higher than average probability of carrying the same beneficent rule as A, the result of A's help is an increased chance that the rule will be passed on. Hence, there is a positive selection pressure on the rule. Of course, A's help to B may also be costly to A in terms of reduced resources or increased exposure to threatening conditions. Those costs should make A *less* attractive as a model for imitation, producing negative selection pressures. But if the costs to A are substantially less than the benefits to B, the net effect will be positive.

What is important here is not the initial levels of success of A and B, but the marginal change in success as a consequence of A's helping B. If the recipient of help is an unemployed mother on welfare in an urban ghetto, one might suspect that the help is of little consequence for rule propagation since the

woman is unlikely to be an attractive model for anyone. But that's just the point. Because she is at the low end of the status hierarchy, any *change* in her welfare is likely to make an especially big difference. Such a change might be critical in her children's decisions to imitate her or the local crack dealer.

The general argument is similar for teaching as a mode of rule transmission. What makes someone an effective teacher? There are many probable determinants including persuasive skills, access to appropriate rewards and punishments, access to communication media, time to devote to teaching, and the possession of an effective text or script. These are only imperfectly correlated with the factors that make people effective models for imitation. One determinant that the two modes have in common, however, is success. In the first place, "students" are more likely to learn from successful teachers for the same reasons that they are more likely to imitate successful people. Second, success often means greater access to the material resources that make people effective teachers, such as rewards and punishments, communications media, and time available for teaching. Consequently, any help that A gives to B is likely to increase B's effectiveness as a teacher. And if B has a higher than average probability of following the same rules as A, the result may be a net increase in the likelihood that those rules will be passed on.

Despite this commonality between imitation and teaching, there are several important differences between the two modes of transmission. Although imitation is robust, in the sense that it is difficult to disrupt and it operates in almost all settings, it is also prone to errors. Imitators may adopt only a rough approximation of the observed behavior, or they may misperceive the conditions under which the behavior is to be performed. Teaching is potentially much more effective than imitation in ensuring that a rule is adopted and that it is learned correctly. Yet, there are two related features of teaching that raise problems in transmission of beneficent rules. First, teaching tends to be much more focused than imitation on specific items of behavior. Thus, if you persuade me to donate blood annually, that may be the only thing that I learn from you. Second, whereas imitation requires only the visibility of the model, teaching requires that the teacher be motivated in some way to teach the rule. Thus, a complete explanatory model must take teacher motivation into account.

The selection mechanism we have just been considering works by identifying and exploiting existing differences in the probability that people are carriers of the general rule. The "cultural fitness" of those with a higher probability of carrying the rule is enhanced by the receipt of help from others, making it more likely that they will pass the rule on to others. There is another selection mechanism, however, that works by directly increasing the probability that people will be carriers of the rule. Since this mechanism only applies to a particular subclass of beneficiaries, it is most naturally discussed in the next section.

I have argued that a rule which says "Be good to those who have a higher than average probability of being carriers of this rule" should experience positive selection pressures (in addition to negative pressures). But does anyone follow this rule? If so, why aren't we aware of it? And how can someone tell if a potential recipient of help has a higher than average probability of following the rule? I believe that the reason we do not notice this rule is that it does not

exist in its pure general form. What we find, instead, are many specific rules that provide concrete "strategies" for identifying appropriate recipients of help. These rules can be grouped into several classes, based on the criteria for identification.

## Cultural Lineages

One important class of rules has the form

1. Be good to your cultural descendants.

Under our somewhat restricted sense of culture, a person's cultural descendants are all those people who have learned or are likely to learn rules from that person. Now if A has adopted a class 1 rule and B is a cultural descendant of A, we would expect a higher than average probability that B has adopted the same rule. Beneficent acts by A toward B will increase B's welfare and, hence, increase the chances that B will pass on the rule to a subsequent generation.

What I have just described is analogous to genetically transmitted parental altruism, and it works for the similar reasons. One major difference, however, is that genes for altruistic behavior have a fixed chance (50%) of being passed on to a child, while the chance of passing on a learned rule to another person is highly variable and itself culturally influenced. People cannot choose their genes, but they can choose whom they will imitate. This indeterminacy does not invalidate the argument because the mechanism requires only an ability to discriminate *probabilities* of rule adoption. As long as I can identify some people who have a higher probability than other people of adopting my rules, beneficent acts toward those people may help to propagate my rules. Nevertheless, the greater indeterminacy in the cultural realm does imply that the strength of the positive selection pressures operating on a given rule will vary greatly with the setting, and I shall later suggest some major sources of variation.

One setting that is likely to be particularly important is cultural transmission from biological parent to child. At least in the past, this has been the most important channel for all cultural transmission. As a consequence, class 1 rules should strongly reinforce genetic parental altruism; indeed, it may be very hard to separate the two empirically. On the other hand, there are also many reasons to think that parental influence has declined in most industrial cultures over the past two centuries, suggesting a concomitant decrease in cultural selection processes that support parental altruism.

In addition to the genetic analog, there is another mechanism that may produce positive selection for norms of beneficence toward cultural descendants. Beneficent acts do not just increase the capacity of one's cultural offspring to pass on beneficent rules. They may also directly increase the number of one's cultural offspring by making the beneficent actor a more attractive model or teacher. This pattern follows if we assume that (1) people are more likely to associate with those who are "nice" to them (that is, perform beneficent acts toward them) and (2) association between any two people increases the

likelihood of mutual rule adoption. Moreover, if A is in a "superior" position to B, the rule adoption is likely to be one-way.

These two mechanisms could explain, in part, the beneficent behavior of professors toward their graduate students. Consistent with most work in the sociology of science, let us assume that the principal reward that is of interest to professors and students is prestige within the scholarly community (Hagstrom 1965). Evidence suggests that prestige is a key determinant of the number of cultural offspring that a professor has; those with high prestige attract more students (Hagstrom 1967). Among professors of equal prestige, however, it is likely that professors who devote more time and resources to their students will attract more and better students. When those students become professors themselves, they are likely to model their behavior on their supervising professors, that is, to invest resources in their students. That behavior will again attract more students. Moreover, those students who receive extensive help from their professors will tend to be better equipped to do first-rate research, thereby enhancing their prestige. This pattern will also enable them to attract more students. Over an extended period of time, therefore, one might expect the beneficent behavior to proliferate. What about those who break the chain and choose not to imitate their professors' beneficent behavior? They will have fewer students and those students will receive inferior training, thereby reducing the likelihood that the "selfish" behavioral patterns will be passed on.

Clearly there are also self-interested explanations of these behaviors. In the graduate school setting, professors are required by organizational norms to devote some of their resources to graduate students; these norms are maintained by sanctions, and it is therefore in the professor's self-interest to conform. Yet, casual observation suggests that the level of beneficent behavior is much higher than that required by enforceable rules; nor can such rules explain the wide variations in how professors treat their students. Another explanation is that producing good students in itself enhances a professor's reputation, yielding a direct self-interested payoff. My own belief, however, is that the marginal return (in terms of one's own prestige) from investing in students' current and subsequent research is almost always lower than the marginal return from investing in one's own research.

These self-interested accounts clearly do not negate the possibility of the selection mechanisms that I have proposed, and their existence helps to explain why such mechanisms might work for professors and their students, but not for occupations like real estate sales or race car driving. Organizational norms and prestige payoffs from beneficence produce a substantial degree of congruence between the interests of professors and their students. Under those conditions, it is difficult for a professor to determine the boundary between self-interest and altruism. Hence, any processes that would tend to push behavior toward the altruistic pole will have much less resistance to overcome. In the case of realtors, by contrast, there are few organizational rewards for training or helping other realtors. And there is certainly minimal prestige gain in having trained someone else to be a successful realtor. In this case, a person's cultural offspring quickly become direct competitors in what approaches a zero-sum game. In general, we can expect that selection processes favoring beneficent behavior will be much more difficult to establish and sustain when conflicts of interest loom large.

It is useful to separate class I rules into two subclasses, depending on the mode of transmission. The first subclass is

1a. Be good to those who imitate you.

The professorial example is a member of this subclass.[7] Another member is the class of rules that says "Be good to children" where the term *children* is not restricted to one's own biological children. This rule follows because children are such intense imitators that they are likely to imitate anyone who behaves in a beneficent manner toward them.

It would be natural to describe the other subclass by the general rule "Be good to those whom you teach," but such a rule will not necessarily be positively selected. Because teaching tends to be much more restricted in content than imitation, a beneficent rule will not be transmitted unless it is part of that content or unless students are also imitating their teachers. We would not, for example, expect that a rule requiring high school algebra teachers to be beneficent to their students would experience positive selection pressures.

On the other hand, beneficent behavior that is a part of what is being taught may be strongly selected for. Consider the two-part rule:

1b. (1) Teach this rule and part 2 to other people.
   (2) Be good to those to whom you teach this rule.

The great advantage of this normative package is the increased probability that one's students will actually possess the rule. Examples are often found in conversionary religious movements in which converts are taught to make other converts. While conversionary movements can be successful without a beneficent component, they may be greatly enhanced if they include a directive of kindness toward converts. The most important reason is that the receipt of beneficent behavior can be a strong incentive toward conversion; witness the frequency of "love bombing" in contemporary cult movements. But even if the probability of conversion is not increased by beneficence, a transfer of resources from teacher to convert can increase the convert's capacity to make other converts. Of course, this is only "cost-effective" if the teacher's resources substantially exceed those of the convert.

The chief danger with class 1b rules is the possibility that the two subrules may become disconnected. There must be some cultural mechanism for insuring that people learn to both make converts and be beneficent toward those converts. Mechanisms for accomplishing such linkages will be discussed below under the heading "Marker schemes."

The natural complement of beneficence toward cultural descendants is the class of rules that can be expressed as

2. Be good to your cultural ancestors.

Rules that mandate beneficence toward ancestors may be positively selected, but that is more problematic than for class 1 rules. One reason is that beneficent behavior toward ancestors cannot increase the number of ancestors. Another reason is that ancestors often have more resources than descendants, so a transfer from the latter to the former may actually lower the probability that the

rule will be passed on. An important exception, however, is when a cultural ancestor is faced with threat of serious harm.

Class 2 rules may often appear to exploit the donor since the ancestor usually has a strong self-interest in teaching the rule. On the other hand, there are many cases in which the ancestor expropriates only a small fraction of donated resources for personal use, the rest going to benefit or expand the set of descendants. Television evangelism sometimes fits this description. Large numbers of cultural descendants (the TV audience) make relatively small monetary sacrifices for the benefit of their ancestor (the evangelist). These beneficent acts enhance the ancestor's capacity to "sire" more descendants.

What about rules that say "Be good to your biological parents"? Such rules are found in many cultures, and it is reasonable to ask if they might be subject to the positive selection pressures described here. Parents clearly have an interest in convincing their children to help them in their old age, so there is no difficulty in explaining why parents would teach such rules. On the other hand, children who adopt those rules would be sacrificing resources when they were at the peak of their reproductive powers (both biologically and culturally) in order to donate them to parents who were past the age of reproduction. This sacrifice would seem to create a substantial selection pressure against the rule. One way around this difficulty is to argue that cultural fecundity does not decline nearly so rapidly as biological fecundity. Especially in societies where old people have generally high prestige, there could be substantial propagative effect in maintaining one's parents at a respectable level of subsistence. Old people who are doing well probably have more influence than those in poverty, thereby increasing the chances that others will adopt their rules. Furthermore, the status of aging parents can have a marked impact on the reputation of their adult children, enhancing the capacity of those children to pass on rules to others. These explanations lead to the prediction that rules for beneficence to parents should decline in frequency with decreases in the general cultural influence of old people and with decreases in the linkage between the social reputations of parents and children.

A trivial but illuminating example of a class 2 rule is the chain letter. For example, I receive a letter that contains four names and addresses. The letter instructs me to send $5 to the name at the top of the list. I am also directed to retype the letter, removing the name at the top and putting my name on the bottom, and then to send the new version to four other people. The promise is that I will receive as much as $1,280 from people further down the chain. Various curses are invoked against those who break the chain.

The essence of the chain letter is captured in the following two-part rule:

2a. (1) Teach this rule and part 2 to other people.
    (2) Be good to those who teach you.

There is an obvious similarity to Class 1b except that beneficence is directed from the student to the teacher rather than the reverse. The selection mechanism acting on this rule is also somewhat different. The beneficent component (part 2) does not in itself increase the likelihood of more or superior cultural offspring. Rather, the opportunity to be on the receiving end serves as an incentive for performing part 1, the propagation activity. Of course, there is no guarantee that

the effort of sending out four letters will be repaid by contributions from one's students. Indeed, the "rational" strategy is to send the letter to four other people but not send the $5; that is, to obey part 1 but not part 2. But if everyone followed that strategy, no one would get any money.

For this reason, the curse plays a critical role in preventing the uncoupling of the two acts. In particular, recipients of the letter must be able to say to themselves "If this letter convinces *me* to send $5 to an unknown person, then other people will also be convinced." Of course, the chain letter is not indefinitely sustainable. Only a fraction of any given population is susceptible, and that fraction will eventually be exhausted.

To sum up, rules that mandate beneficence toward cultural descendants or ancestors may experience positive selection pressures because such people are exceptionally good candidates for the receipt of help. They are usually easy to identify. And they are much more likely than others to have already adopted or to adopt in the future those beneficent rules that are carried by the focal individual. Hence, the receipt of help tends to promote further dissemination of the beneficent rules.

## Collateral Kinship

Class 1 and class 2 rules are actually special cases of a more general class:

3. Be good to your close cultural relatives.

I treat this as a distinct class in order to focus on those cases in which the recipients are *not* cultural parents or cultural children, but rather are cultural siblings or cousins. Again, to be fully operational, rules in this class must specify when and when not to be beneficent to one's cultural relatives. We must also specify and explain who close cultural relatives are. In the genetic realm, relatives are those who have genetic ancestors in common. The closeness of a genetic relative can be mathematically defined as a function of the number and generational distance of the common ancestors (Wright 1968).

I believe that the basic idea of collateral kinship can be transferred to the cultural realm. Elsewhere I have attempted a mathematical formulation (Allison 1992), but here I want to develop some of the qualitative considerations. My cultural relatives are those people who have inherited or adopted rules from the same people who gave me mine. A cultural relative is "close" to me if we have many such cultural ancestors in common and if those ancestors are relatively recent and/or direct. In contrast to the genetic realm, however, the number of immediate cultural parents is not a fixed number. Surely, I have many more cultural parents than a Bantu tribesman. Moreover, the technology of information storage and transfer has steadily expanded the possibility of direct cultural parentage. For example, I would include among my own immediate cultural parents Plato, Newton, Darwin, Franklin, and Maimonides, each of whom has directly (albeit posthumously) transmitted rules to me.

The rationale for the existence of positive selection pressures on class 3 rules derives, again, from an analogy with genetic kinship altruism. If you are my close cultural relative, there is a greater than average chance that we have rules

in common. In particular, if I have adopted a rule that says "Be good to your close cultural relatives," there is a higher than average probability that you have adopted the same rule. Consequently, beneficent acts that I direct toward you may increase the probability that you will pass on the rule to someone else.

There are complications, of course. A fundamental problem for any system of beneficence toward collateral relatives, whether genetic or cultural, is the reliable estimation of kinship. Identification is relatively easy for parents and children, but is usually harder for siblings and still harder for cousins. Often the best that can be achieved is a rough approximation, and the quality of that approximation may vary greatly from setting to setting. In the genetic realm there are three well-known methods of kinship identification: spatial proximity, association, and phenotypic matching (Holmes & Sherman 1983). I shall consider all three as plausible candidates for human identification of cultural kin, but there may be other methods as well.

Given the typical ways in which culture is transmitted, a reasonable inference is that close biological kin are also close cultural kin. Thus, a culturally transmitted rule that says

3a. Be good to your close biological relatives

might experience positive selection pressure. Such rules are likely to intensify any genetically based kin altruism. It is also likely that, at least in traditional societies, the degree of cultural relatedness will fall off less rapidly than genetic relatedness, as biological kinship becomes more distant (Allison 1992), largely because cultural transmission can also be horizontal (to members of the same generation) and oblique (to other people's children) (Cavalli-Sforza & Feldman 1981). Moreover, human ability to record and communicate genealogies facilitates more reliable differentiation of distant biological kin from nonkin (which may help to explain the obsession with genealogies in ancient writings). Consequently, beneficent rules that direct behavior toward biological kin may have encouraged the development of clans and other large extended family groupings, which could not have arisen from purely genetic processes. Again, however, we may hypothesize that positive selection pressures on norms of this sort will decline with a decreasing importance of genetic relatives for cultural transmission.

In populations with limited physical mobility, spatial proximity can be a good indicator of cultural relatedness just as it is for genetic relatedness. Consequently, we may expect positive selection pressures on a rule that says

3b. Be good to your neighbor.

We might also expect that cultural kinship is less restricted by distance than genetic kinship. Specifically, horizontal and oblique transmission combined with developments in communication technology could mean that cultural related-ness declines less rapidly with physical distance. As a result, cultural transmis-sion could produce larger spatial aggregations of mutual altruists than genetic transmission. Of course, as physical mobility increases, positive selection pressures on such rules should diminish. Interestingly, in the biblical dictum "Love your neighbor as yourself" (Leviticus 19:18), the term *neighbor* is often

interpreted by theologians to mean everyone (Hertz 1981), but the theory proposed here implies that the rule may be positively selected only under its literal interpretation.

Among animals with a capacity to recognize and remember distinct individuals, association is often an important signal for genetic kinship, especially association at early ages. Animals usually learn who their siblings are, for example, by growing up with them. Association should be even more important for identification of cultural kin because cultural transmission occurs largely through networks of associates. Regardless of physical distance, those with whom I interact frequently are surely more likely than others to share cultural ancestors with me. Thus, a rule that says

3c. Be good to your associates

may experience positive selection pressures.

Animals may also identify genetic kin by observing whether the other animal resembles them, a process known as phenotypic matching. Such matching requires a reference standard, which may be learned by observing either oneself or other known relatives. The analog for the identification of cultural kinship may be embodied in the rule:

3d. Be good to those who act like you.

Thus, if I want to estimate the probability that you and I have cultural ancestors in common, a good method is to observe how many cultural traits we share. Do we have the same language, do we dress the same way, do we engage in the same religious rituals, do we play the same kind of music, do we use the same kinds of weapons, do we eat the same foods?

One complication is that, at least in "modern" cultures, cultural transmission tends to be differentiated into several domains: religion, science, language and literature, music, sports, etc. Influential individuals may have many descendants in one domain but few or none in others. Consequently, while you and I share some common scientific ancestors (or you would not be reading this), we may have very different religious ancestors. This difference is important because some domains yield better information about cultural kinship than others. In general, domains that emphasize behavior oriented toward adaptive considerations are probably less reliable indicators of cultural relatedness than domains that emphasize conventional or symbolic behavior. This is because one would expect to find convergence in adaptive behaviors even when there are no common cultural ancestors. Shared religious practices, for example, should be a more reliable basis for identifying close cultural kin than shared scientific practices. And identification of common literary traditions should be more reliable than identification of common agricultural technologies. All this suggests that class 3 beneficent rules should experience the strongest positive selection pressures in the conventional-symbolic domains.

## Marker Schemes

The problem with cultural kinship is that, like genetic kinship, it tends to be rapidly diluted as kinship becomes more distant. Although this makes deception much more difficult and less profitable, it can also greatly restrict the number of suitable recipients of beneficence. For a variety of reasons already discussed, I expect that this dilution will be less rapid in the cultural realm than in the genetic realm. Nevertheless, even under cultural kinship rules, the range and number of people who would be good candidates for the receipt of helping behavior is necessarily limited.

There is, however, a class of rules that can be regarded as a special, extreme case of phenotypic matching (class 3d), but which does not have the usual limitations of cultural kinship. Because of its importance and unusual properties, this class is best treated separately. It has the following general form:

4. (1) Do X.
   (2) Be good to those to who do X.

Here X can be any distinctively recognizable behavior, such as wearing a turban or abstention from certain foods. This normative package, which I call a marker scheme, is potentially very powerful because the marker behavior (1) is not necessarily degraded in successive generations and (2) may be relatively easy to discriminate.

What distinguishes marker schemes from other forms of phenotypic matching is that, in the general case, such matching involves an overall comparison of similarities and differences (possibly within some particular domain). The greater the similarity, the higher the estimated probability that the person carries a beneficent rule, and the higher the mandated level of beneficence. Marker schemes, on the other hand, focus on a specific behavior or set of behaviors and make no distinction between close or distant relatives. The same behavior is mandated toward all those who exhibit the marker, regardless of how similar or dissimilar they are in other respects. Consequently, schemes of this sort allow for the possibility of large numbers of mutual benefiters.[8]

The principal limitation of marker schemes is the difficulty of maintaining the link between the beneficent behavior and the marker behavior. If I am surrounded by people who are beneficent toward those who speak a certain language, then I will do better by adopting that language but abstaining from the beneficent behavior. One would, therefore, expect strong pressures at the individual level to disconnect the two rules. Nevertheless, I suggest that there are also cultural devices that can counteract these pressures. One set of devices protects against invasion of outsiders, while another set helps to prevent insiders from becoming free riders.[9]

Invasion by outsiders can be resisted by increasing the cost of mimicry, which can be accomplished by making the marker behavior very elaborate, complex, or intrinsically difficult to perform (Frank 1988). Language is a good example. It is learned effortlessly as a child, but mastery of a new language as an adult requires an enormous investment of time and energy. Even then, it is usually easy to distinguish a native from a nonnative speaker.

Religious rituals provide an example of markers that may be not only difficult to learn, but may also require actions that are intrinsically costly or that appear to be costly to outsiders. For example, ritual circumcision, performed routinely on infants, is a highly effective way to discourage adult conversion by potential free riders. If people are willing to undertake such costly behaviors, it is a strong indication not only of their commitment to the culture as a whole but especially of their willingness to undertake the costs of beneficent behavior. As with phenotypic matching generally, behaviors that are purely conventional and symbolic should be better candidates for markers than behaviors that have a high adaptive significance (Boyd & Richerson 1987).

The way to resist dissimulation by insiders is to make it more difficult for people to pick and choose among alternative rules. Cultural elements tend to be combined into packages of varying complexity that seem to resist decomposition over substantial periods of time. Although we tend to take such packaging for granted because it is so commonplace, I believe that it (like altruism) is a phenomenon in need of explanation. I suggest that there are many different cultural devices that can serve to link cultural elements, and the existence of such devices raises the possibility of linking beneficent rules with other rules. While these devices must obviously be invented by individuals or small groups with some particular objective, they may well outlive their inventors and come to serve quite different functions than those originally intended.

Sustained cultural linkages may be difficult, if not impossible, for those rules that are transmitted wholly by imitation; I have not been able to find any plausible examples. Transmission by teaching, on the other hand, opens up the possibility of embedding cultural elements, including rules, into narratives. To serve the function of linking cultural elements, a narrative must have, at a minimum, a strong resistance to change as it is transmitted from one person to another. There are several ways of making it costly or unappealing to change a narrative. For example, if a narrative is a dramatic description of events (a story), there is some minimal set of elements that must be present if the story is to make sense or retain its dramatic appeal. Similarly, structured arguments employing conventional rhetorical standards often have an inner logic that is difficult to maintain if new elements are arbitrarily substituted for old ones. Ideological systems, for example, are more difficult to break apart than are haphazard collections of proverbs (which may explain why proverbs typically emphasize the benefits of reciprocity rather than true altruism). In an ideological system, moreover, there is usually an overarching mythology that legitimates the entire system, providing a rationale for either accepting or rejecting it as a whole rather than piecemeal. In fact, many narratives are self-justifying in the sense that they include arguments for not changing the narratives, including threats toward anyone who would make alterations.

Transmission technology has much to do with how well narratives can resist alteration. With oral transmission, it is much more difficult to preserve an intact narrative over long stretches of time. Even those with good intentions of faithfully transmitting the narrative may make errors of memory. Despite these difficulties, the development of various mnemonic devices made it possible to preserve surprisingly complex traditions over many generations. But the development of writing was unquestionably a major step forward in the

capacity to link cultural elements into a text and transmit them faithfully. This development reached its apex when texts came to be regarded as sacred repositories of culture (e.g., the Torah and the Koran). A strong case could be made that the most powerful and extensive altruistic systems heretofore observed are based on sacred texts.

I do not mean to suggest that sacred texts are deliberately designed to avoid deception in marker schemes, although that may happen in some cases. Rather, I claim that when such texts are created, for whatever reason, they provide an ideal vehicle for linking beneficent rules to marker behaviors. To the extent that such links are effective, they can enhance the probability that the texts will be passed on.

It must be stressed that narratives need not be 100 percent effective in eliciting the marker behavior and the beneficent behavior in order to yield positive selection pressures. What is necessary, aside from maintaining the linkage in transmission, is that exposure to the narrative raises the joint probability of the two behaviors. As a consequence, whatever beneficent behaviors are elicited by the narrative have a higher than average probability of benefiting someone who will transmit the narrative.

I make this claim with full awareness that texts are subject to highly divergent interpretations that may, at times, coalesce into intense conflicts between competing factions. Despite these tendencies, any text will put *some* limits on the range of plausible interpretations, and within those limits the crucial linkages may be maintained. Text-based groups often experience ideological splits as the group grows larger, but that may simply mean that the text is not "powerful" enough to maintain a group of that size. Within each new group, the linkage between marker and beneficence can continue to be effective, although the marker may come to be modified sufficiently to distinguish each group from others that are based on the same text.[10]

In general, we would expect linking devices to have a certain inherent instability. On the one hand, there are cultural innovations that tend to support beneficent rules, or which bind such rules more tightly with other elements of culture. On the other hand, there are cultural innovations that tend to break down the intracultural connections or which reduce the effectiveness of the beneficent rules. At any given time, one or the other of these two processes may have the upper hand. Moreover, mechanisms that bind cultural elements together may be effective in one sociocultural environment but not in another. Supernatural myths, for example, may be persuasive among an uneducated population but may lose their potency as education levels rise. As a result, we should not be surprised to find major ebbs and flows in the level of beneficent behavior.

## Discussion

I have described several mechanisms of cultural transmission that may result in positive selection pressures on rules mandating beneficent behaviors. These mechanisms do not require that those who perform beneficent acts receive any direct benefit from their actions. Instead, they require that the beneficent

behavior either directly increase the number of carriers of the rule or increase the likelihood that existing carriers will be able to pass the rule onto others. If the strength of these positive selection pressures is sufficient to overcome negative pressures (both biological and cultural) against self-sacrificing behaviors, the result can be the proliferation and/or maintenance of what we commonly describe as altruistic behavior.

While my principal aim has been to argue for the plausibility of such mechanisms, I have also proposed some hypotheses about variations in their existence or strength. To some extent, these hypotheses are specific to the various rules I have described. Despite that heterogeneity, they appear to fall into four broad classes:

*1. Factors affecting the degree of cultural relatedness in a population or subpopulation*

If cultural relatedness is low in a population, the positive selection pressures on beneficent norms will be weak. Transportation and communication technologies can increase relatedness, especially when there is centralization. Moreover, cultural relatedness in a population may vary inversely with cultural relatedness in subpopulations. Thus, over the past 200 years, cultural relatedness in the U.S. as a whole may have been purchased at the cost of reduced cultural relatedness within states.

*2. Factors affecting the ability to reliably estimate the probability that other people are carriers of the rule*

If this ability is weak, positive selection pressures will also be weak. We would expect, for example, that culturally based parental altruism will be greatest in those societies in which parents have the greatest influence on their children and, hence, have a higher degree of confidence that their children will adopt their norms. Similarly, I have argued that beneficent norms are more likely to be transmitted in cultural domains that are highly conventional rather than adaptive because there are likely to be more identification errors in the latter.

*3. Factors affecting the ability to link beneficent rules with other cultural elements*

Cultural inventions that package cultural elements into relatively indivisible sets create an ideal environment for the proliferation and maintenance of beneficent norms. Packages that contain both beneficent norms and marker norms have a distinct advantage over alternative packages.

*4. Factors affecting the ability to assess costs and benefits of beneficent behavior*

The easier it is to assess costs and benefits, the stronger the negative selection pressures on beneficent norms. Thus, incommensurable metrics and complex outcomes favor the transmission of such norms, but a market economy, which converts all outcomes to a common metric, is very unfavorable. This may explain, in part, why we see so little beneficent behavior in the business world.

A characteristic feature of the mechanisms I have considered is that none of them requires the presence of any centralized authority or leadership. That was quite deliberate because my aim was to see how far one can go *without* any centralization. Nevertheless, it does not mean that I regard centralized authority

as unimportant. Clearly, leaders can facilitate or discourage the positive selection pressures on beneficent norms by manipulating the factors just considered. And they may also more directly elicit altruistic behavior in ways that are beyond the scope of this paper. Of course, the question of centralization is closely related to the existence of sanctioning systems. Although I have argued that mechanisms of this sort do not require sanctions for their operation, the complete absence of sanctions is likely to be an ideal-typical situation. Rather, what we are likely to find in the real world are mixtures of sanctions and cultural kinship systems, possibly in situations where neither alone would be sufficient to sustain the rule.

Another crucial question is the degree to which the processes I have proposed are consistent with genetic evolution (Richerson & Boyd 1989). In most cases, the kinds of rules described here are likely to enhance reproductive fitness. Although any given beneficent act may reduce the reproductive fitness of the donor, as a group, people who adopt such rules should have greater average fitness than those who do not, largely because the rules mandate a transfer of resources from those who need them least to those who need them most. Nevertheless, there seem to be cases in which sustainable, beneficent rules require behaviors that are contrary to the average reproductive interests of those who adopt them, yielding long-run outcomes that are contrary to those expected by purely genetic evolution. These occur primarily when the transferred resources are diverted away from reproduction.

Perhaps the most clear-cut example of cultural benefits overcoming reproductive costs is the norm of celibacy among Roman Catholic priests and nuns (Dawkins 1976). Celibacy has to be one of the most reproductively damaging norms imaginable, yet (as the Church has long maintained) it frees up substantial resources for these religious functionaries to invest in the recruitment of their cultural descendants. Thus, at least until recently, religious celibates have been able to persuade and support substantial numbers of young people to adopt the norm, so that growth and/or maintenance have occurred over long periods of time. Of course, if such a norm is *too* successful, as in the case of the Shakers (Foster 1981), the long run consequence may be extinction.[11]

How much observed beneficent behavior can be explained by the kinds of processes I have described? At present, this is obviously difficult to answer in any definitive way, but it is possible to get some rough indications. All the classes of rules that I have considered require some cultural connection or similarity between the donor and recipient, and we may ask whether most beneficent behavior involves such connections. Although the evidence is largely impressionistic, it is also overwhelming. Regardless of what people say (and what they say is frequently consistent with what they do in this case), it is incontrovertible that people are much more willing to sacrifice their own interests for those who are similar to them, who live near them, who share the same social position, etc. The limited scientific evidence on this point is also unequivocal (Bar-Tal 1976; Batson et al. 1979; Dovidio 1984; Krebs 1975; Levine & Campbell 1972; Meindl & Lerner 1983; Yamagishi & Sato 1986). Ethno-centrism is the rule rather than the exception.

Yet, there are also many cultural traditions which specify that altruistic actions should be directed toward all of humanity, and there are many well-

documented acts of heroic self-sacrifice directed towards people who are carriers of quite different cultural traditions (Oliner & Oliner 1988). An explanation of the emergence of such traditions and behaviors may be beyond the scope of the mechanisms described here (but see Richerson & Boyd 1989). Even when a tradition includes strong universalistic norms, however, there is usually preferential treatment for members of the same group, either in theory or in practice. Rabbinic Judaism, for example, contains a highly universalistic system of obligations to both Jews and Gentiles, while at the same time emphasizing the special obligations to other Jews.

The mechanisms I have described are clearly appropriate for one-to-one acts of beneficence, but they may also work for actions that benefit many people. On the other hand, it is not so clear that these mechanisms can explain actions that serve the collective interests of large groups of people, primarily because the beneficence may not be sufficiently discriminating. Consider a rule that says "Don't use fluorocarbon sprays." For this rule to be positively selected, either (1) those who use such sprays would have to produce fewer cultural descendants than those who do not, or (2) those who adopt the rule would have to be more likely, on average, to receive benefits that make them effective teachers and models as compared with those who do not adopt the rule. Neither of these possibilities seems very likely, largely because the benefits of such normative behavior are conferred indiscriminately on everyone, whether they adopt the rule or not. On the other hand, a rule that says "Vote in elections" might result in positive selection pressures. If we assume that those who vote are likely to vote for candidates and policies that favor "people like them," the net outcome could be a relative increase in the number of cultural descendants of voters.

Before concluding, I shall briefly comment on some possible ethical implications of the theory presented here. Axelrod (1984) has argued for the moral virtue of strict reciprocity: reward those who are good to you and punish those who are bad to you. His rationale is that such a rule cannot be exploited, and that if everyone followed the rule we would all be better off. If the present theory is correct, then the beneficent rules I have described may also satisfy those criteria: they are resistant to exploitation and they increase the general welfare if everyone adopts them. That argument, in turn, suggests that selective beneficence is morally superior to universal beneficence (at least from a utilitarian viewpoint). Moreover, universal beneficence could actually be judged immoral because it "wastes" resources and encourages exploitation (G. Hardin 1982).

While that argument deserves consideration, I think it should be approached with great caution. We do not know all there is to know about beneficent behavior, and there may be unexpected benefits from behaviors that currently seem quite puzzling. The very fact that universal benevolence is so widely taught suggests that *something* is sustaining it (see Alexander 1987 for a sociobiological explanation of this phenomenon). Moreover, just as strict reciprocity may lead to destructive feuds between individuals, selective beneficence can support intense and bloody conflict between groups. Hopefully, we can develop and teach a set of sustainable rules that do not have such detestable consequences.

## Notes

1. Simon's (1990) model for the evolution of altruistic behavior fails to take account of the selective pressures that impinge on cultural determinants.

2. The theory also applies when the gene is common, but then the interpretation of the coefficient of relatedness is not so straightforward. Specifically, suppose that $p$ is the proportion of individuals in a population who carry an altruistic gene, and $P$ is the conditional probability that you carry the gene, given that I carry it. The coefficient of relatedness( between you and me) is then defined as $r = (P - p)/(1 - p)$. If $p$ is very small (i.e., the gene is rare), $P$ and $r$ will be approximately equal.

3. The rather unrealistic assumption that altruism is controlled by a single gene is not essential. Even when altruism is controlled by many different genes, kinship altruism should increase the frequency of those genes in the population (Trivers 1985).

4. Until recently, a popular explanation for altruistic behavior was the theory of group selection (Wynne-Edwards 1962). Altruistic behavior can clearly benefit a group of animals. For example, a species that is threatened by overpopulation would be better off if individuals voluntarily limited their reproductive activity. Natural selection, the argument goes, ought to favor those species whose members have a capacity for such altruistic behavior. The flaw in this argument is that selection pressures on groups are almost always overwhelmed by selection pressures on individuals (Williams 1966). This is a consequence of both the difficulty of maintaining group boundaries and the relative infrequency of species death as compared with individual deaths. Although plausible models of group selection have been constructed (Boorman & Levitt 1980; Wilson 1980), such models only apply under highly unusual conditions and for very short periods of time. As a result, group selection theory in sociobiology has been largely relegated to the status of a theoretical curiosity.

5. Some would go further and require that a rule should not be called a norm unless sanctions are applied to violators but, again, I believe that this defines away what should be an object of enquiry. Specifically, I would argue that existence of sanctions is often a consequence of widespread rule adoption rather than an explanation for it.

6. For simplicity, I have expressed this rule in dichotomous form: either be good or don't be good. A person either has higher than average probability or does not. Alternatively, a continuous rule might say something like "the level of beneficence should be directly proportional to the difference between the probability that a particular individual carries the norm and the overall probability in the population."

7. I imagine that it is rare for professors to explicitly teach their students to be beneficent toward their own students.

8. In the genetic realm, marker schemes have been referred to as "green beard" mechanisms (Dawkins 1979). The idea is that a gene that produced both green beards and altruism toward other animals with green beards would have extraordinary evolutionary advantages. Yet, there seem to be no examples of such mechanisms in the animal kingdom. The most commonly proposed explanation for this absence is the likelihood of deception. Although a green-beard-altruism gene would be expected to proliferate rapidly, a population of such gene carriers could easily be invaded by carriers of a gene that produced green beards but no altruism. These invaders would reap the benefits without suffering any of the costs. The probability of such an invasion is rather high since it is likely that the original green-beard-altruism "gene" was actually a linkage of two or more genes. Because genetic recombination is so extensive with each new generation, the gene linkages would be rather difficult to maintain and, hence, a green-beard-only gene would emerge rather quickly (Tooby & Cosmides 1989).

9. It is tempting to hypothesize that the most direct and inimitable kind of marker would be beneficence itself, as with a norm that says "Be good to those who are good to others." The problem with such a norm is that beneficent behavior alone is not a very reliable indicator that the person is carrying the same norm as you. The observed beneficence could be evoked by genetic kinship, a tendency toward reciprocity, or a rule of universal benevolence. Discrimination among the several possibilities could be more difficult and less reliable than using the purely conventional makers considered in this section.

10. The wearing of a head covering (*kipah*) is a distinctive marker for Orthodox Jews. In Israel, however, competing factions within Orthodoxy have adopted different styles of *kipot* which may serve as signals for behaviors of beneficence and loyalty .

11. In many cases, cultural systems can be regarded as parasites on the genetic system. Like viruses, some norms gain control of the human organism in order to make more copies of themselves. As with any such system, there is a danger of overpredation.

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