

The Evolution of Subjective Commitment to Groups: A Tribal Instincts Hypothesis

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Version 3.0 12/02/00. Submitted to R.M. Nesse (ed.) *The Evolution of Subjective Commitment*, Russell Sage Foundation. Please do not cite without author's permission. © by Peter J. Richerson and Robert Boyd. Comments welcome! Word count 14,487.

In August 1914 I was torn between an intense curiosity to see war at close quarters, an intense objection to killing people, both mixed with ideas of public duty and doubt as to whether I could endure danger.

Lewis F. Richardson,

Turbulence theorist, Quaker pacifist, ambulance driver in France, author (posthumously) of *Statistics of Deadly Quarrels*, 1960

Introduction

Expressions of commitment to group goals are commonplace. As we write, our daily newspaper reports several foreign affairs departments from Western nations are exerting pressure on Russia to suspend its offensive in Chechnya and begin peace negotiations. The Chechen President is committed to peace talks, but the current war seemingly has begun because Russia doubts that his government's commitment to control Islamic revolutionaries apparently committed to the armed expansion of their style of regime into neighboring Dagestan. The President of Syria and the Prime Minister of Israel have expressed commitments to peace between their nations and the US President is entertaining them in Washington to demonstrate American commitment to brokering the peace process. A presidential candidate promises to commit the US military to a more liberal policy toward gay soldiers if elected. Democrats in California are committed to using their hold on the state legislature and governor's office to redistrict the states legislative districts as much in their favor as possible, while Republicans are committed to an initiative to place redistricting in the hands of the state Supreme Court.

Indeed, speaking of whole nations as having policies and strategies as if they were individual actors is commonplace. Leaders commonly articulate promises and threats on behalf of whole nations. Thomas Schelling's (1966) classic on the logic of commitment, *Arms and Influence*, speaks almost entirely in this idiom, although he is perfectly clear that the same principles apply to person-to-person negotiation. Of course we know that the reality is more complex. The Israeli Prime Minister left for Washington with the support of only the bare majority of his cabinet for peace talks with Syria. Incumbent Republicans, if history is any indication, will fight Democratic redistricting with big words and little action because the Democrats will induce their personal acquiescence by creating safe districts for them. Nevertheless, the fact that we can speak so casually about commitment to group goals suggests that they really do exist. Doubting them is frequently a recipe for hurt. California voters recently passed a medical marijuana law, but the commitment of Federal prosecutors to rigorous enforcement of the national marijuana prohibition laws in the name of the "War on Drugs" still lands open medical users in trouble with the law.

As L.F. Richardson's reminiscence suggests, commitments to group goals are deeply rooted in the emotions of individual humans who make up groups. The threats and

promises of leaders are only credible to the extent that followers will collectively back them up with passionate action. Richardson's own uncommon commitment to pacifism was deeply enough felt to cause him to risk ostracism for failure of patriotism, but also to volunteer for near-front-line service in the medical corps, and later to turn from his illustrious career as a fluid dynamicist to the study of the causes of war. Millions of his contemporaries were motivated by patriotic sentiments to volunteer to serve in their nation's fighting services. No doubt few indeed envisioned just how terrible trench warfare would prove to be, but no doubt their feelings of duty were, even at the outset, normally mixed with the same trepidation Richardson felt. In the event, most served, suffered, and died faithfully through the horrors of WWI.

Richardson's emotional commitments and the actions they led to illustrate some stylized facts about human commitments to the groups in which they live. First, they are of enormous subjective import. Dramas like *Henry V*, *Saving Private Ryan*, *The Cross of Iron*, and less dramatic but more realistic pieces are often recommended by veterans to civilians to give them some insight into extraordinary emotions that bind soldiers to one another and to their duty, feelings that many find it very difficult to share with those who have not experienced them. Second, one of the reasons that these emotions are so powerful is that they are highly conflicted. Duty struggles with terror in the hearts of soldiers. Not uncommonly fear wins and soldiers run away. Individuals' commitments to their groups are highly contingent. Clausewitz' famous dictum that the moral is to the physical as three to one expresses the military analysts' finding that the morale of an army is its most important single attribute. As long as soldiers feel that they are doing good in a common cause, their commitment to their army is liable to be high. Morale evaporates when soldiers feel they are misused, abused, or exploited for others' personal gain. Third, the group towards which individuals feel an emotional attachment is highly variable: Some people feel slight commitment to any group, some give their families pride of place, some their town, class, or caste, some their nation or religion, and some to all humanity or even all sentient life. Fourth, a given culture generally has a consensus on the nature of the groups to which commitments of various kinds are expected. Most Europeans in 1914 agreed that young men should fight for their nation, most of all the young men themselves. Honorable dissenters like Richardson had the choice of a few tolerated options, such as service in the medical corps. Those who were perceived to avoid service for selfish motives or fear were subject to informal suasion, conscription, and coercive discipline. Early 20th Century nationalism of course had a rather short history in 1914. In the 16th Century, the most enthusiastic bloodletting in Europe was motivated by religion, not nation.

War is an extreme case. However, everyday life is full of behavior that confronts individuals with the dilemma of commitment to groups at personal expense. Voting in elections is a classic example. The chance of anyone's vote actually affecting the outcome of an election is very small, and the costs of casting a vote, particularly an informed vote, are significant. Most votes appear to be cast in voters' conception of the common good, not from selfish motives (Sears and Funk 1990). Temptations to selfish behavior do abound and many do succumb. Many more cooperate, especially when cajoled into arrangements of more secured commitment by those with less secured commitments.

In this chapter we will review empirical evidence that many people have unsecured commitments to groups and advance a theory to explain the data. We know that many, if not most, readers will bring a large dose of skepticism to our argument. We ask only that such skeptics give us a fair hearing. As Miller (1999) observes, people in the rational individualist Western tradition have a strong folk belief in selfish rationality. The scientific versions of the folk belief—rational choice theory and the evolutionary theory of individual fitness—make strong predictions, predictions that hold in the case of most non-human species studied. Yet, when taken into the laboratory most human folk individualists violate the canons of formal individualism. As we will see, folk individualists show high rates cooperation in one-shot, anonymous prisoner's dilemma games, high rates of participation in commons games, and high rates of fair treatment of others resource division games like the one-shot anonymous ultimatum and dictator games. We think that this evidence alone ought to shake individualists' belief in their intuitions.

In this chapter, argue that unsecured commitments to social groups arose by coevolution with cultural institutions subject to group selection. We will refer to the emotions and cognitive mechanisms that give rise to group cohesion and strategic action as "tribal social instincts" and distinguish them from the more ancient social instincts that underpin cooperation in smaller scale groups based on nepotism and reciprocity. Cultural variation is much more easily subject to group selection than are genes because the properties of the cultural inheritance allow persistent, heritable difference between groups. Once culture became subject to group selection, prosocial tribal instincts arose by coevolution with group selected cultural institutions.

One of the great attractions of evolutionary theories is that they are maximally vulnerable to the consilient properties of nature (Wilson 1998). Many different disciplines command data with which an evolutionary explanation must be consistent to be plausible. Five different domains of evidence can be used to test our social instincts explanation of commitments to groups: (1) Checks for logical coherence, typically using mathematical models. Unless we can make a mathematical model of cultural group selection work on paper or in the computer, it probably doesn't work nature. (2) Verification that the proximal mechanisms entailed by the hypothesis actually exist. If we cannot find evidence for proximal psychological mechanisms that produce a measure of unsecured commitment to aid group members, we should doubt that the postulated group recognition and altruism could or did evolve. (3) Tests for the existence of the necessary microevolutionary processes. If operation of cultural group selection can't be detected in the field, it probably doesn't exist. (4) Examinations of the large scale and comparative evidence. Are the differences between human sociality and sociality in other species consistent with the operation of cultural group selection? Have the revolutions in human social organization during the rise of "civilization" been constrained by social instincts? (5) Searches for predicted patterns of adaptation and maladaptation. Natural selection and derivative processes produce characteristic patterns of adaptation and maladaptation. Thus, Hamilton's (1964) famous theory of inclusive fitness shows how selection can shape altruistic adaptations among relatives. It is equally a theory of why selection cannot perfect these adaptations. Reproductive conflicts among kin groups means that cooperation on a larger scale between distantly related individuals cannot evolve, even if

participants fitness would increase if it could. We argue that our tribal instincts hypothesis is more plausible than its competitors in all five domains of evidence.

The Tribal Social Instincts Hypothesis and Its Competitors

The tribal social instincts hypothesis is based on the idea that group selection plays a more important role in shaping culturally transmitted variation than it does in shaping genetic variation, and, as a result, that human have lived in social environments characterized by high levels of cooperation for as long as culture has played an important role in human adaptation. The archaeological record has evidence of our use of symbols, probably to mark social groups among other functions Bettinger 1991: 203-208; Bettinger et al. 1996), for the last 50,000 years and nascent tribes were presumably a still more ancient phenomenon, perhaps 250,000-350,000 years old (Klein 1999: Chapters 6&7). So human minds have been selected for between 2,000 and 10,000 generations in social environments in which the innate willingness to recognize, aid, and if necessary, punish fellow group members was favored by ordinary natural selection (see Richerson and Boyd 1998 for a fuller treatment). We suppose that the resulting tribal instincts are something like principles in the Chomskian linguists' "principles and parameters" view of language (Pinker 1994). The innate principles furnish people with basic predispositions, emotional capacities, and social skills that are implemented in practice through highly variable cultural institutions, the parameters. Humans evolved to be innately prepared to commit to the institutions and projects of their tribes but culture dictated how to recognize who belonged to the tribes, what schedules of aid, praise, and punishment was due to tribal fellows, and how the tribe was to deal with other tribes— allies, enemies, and clients.

Because the tribal instincts are of relatively recent origin, they are not the sole regulators of human social life. The tribal instincts are laid on top of more ancient social instincts rooted in kin selection and reciprocal altruism. These ancient social instincts conflict with our tribal impulses. We are simultaneously committed to tribes, family, and self, even though our simultaneous and conflicting commitments very often cause us the great anguish as Freud (1930) described in *Civilization and Its Discontents* or Graham Greene portrayed in novels such as *The Honorary Consul*.

We have not the space to review in detail all the competing hypotheses to explain the evolution of human social organization. Broadly speaking, however, these fall into two classes: those that emphasize individual level processes and those that emphasize group function. Methodological individualists in the social sciences are deeply skeptical of the group-functional picture of human behavior, and wish to ground the social sciences on the postulate of self-interested rational choice (e.g. Coleman 1990). Evolutionary biologists by and large follow Williams' (1966) lead in rejecting group selection as an important force in nature. In the case of humans, not to mention other animals, selfish behavior and very small scale altruism, for example among close relatives, is common and in accord with methodological individualists' theoretical models. Following Axelrod and Hamilton (1981) and Alexander (1987), individualists reckon that the logic of small-

scale reciprocity can be scaled up to explain human cooperation on the large scale without violating any of the standard assumptions of methodological individualism, such as postulating a strong role for group selection. Evolutionary theories of subjective commitment deriving from these theories imagine that emotions essentially act to buttress individual contracts with other individuals (Hirshleifer 1987, Frank 1988).

The relationship between rational choice theory and cultural evolution theory is complex because we assume that individual choice exists, acts as a force shaping cultural evolution, and in some measure follows ends prescribed by the ancient social instincts (Boyd and Richerson 1993). We hold, however, that choice is boundedly rational and does not normally follow the canons of formal rationality. That is, people form their repertoires of behavior mostly by imitation of others, making adaptive but myopic choices among the cultural variants they observe. More rarely, they independently invent new adaptive behaviors. When the results of such myopic decision-making are accumulated over a population of people and many cycles of imitation and decision-making they indeed become potent evolutionary forces. However, we also suppose that they are not sufficiently powerful to obviate the effects of natural selection *on cultural variation*. Our social instincts hypothesis requires that cultural group selection be strong enough to counter individualistically motivated selfish decision-making in order to favor tribal-scale cooperation, and, as a corollary, to a measure of unsecured commitment to the group's practices and projects.

Group functionalism remains a prominent theory sociology and anthropology. According to Turner (1995) plausible evolutionary models underlie the classic functionalist theories of Durkheim and Spencer and their successors, but these ideas have not been formally elaborated and tested in the style of evolutionary theory in biology, so little more can be said about these contributions. Darwin (1874: 179) himself articulated a clear group selection argument to account for human cooperation: "A tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection." Darwin's list of pro-social virtues is easily read as a list of unsecured or weakly secured subjective commitments to group welfare. (We discuss what we mean by "weakly secured" below.) One possibility is that humans are genetically group selected. Several prominent modern Darwinians (Hamilton 1975, Wilson 1975: 561-2, Alexander 1974, and Eibl-Eibesfeldt 1982) have given serious consideration to group selection as a force *in the special case* of human ultra-sociality. They are impressed, as we are, by the organization of human populations into units that engage in highly organized, lethal competition with other groups, not to mention other forms of cooperation. Direct group selection on genes is a process that could give human groups a degree of functional integration. A second view is that processes peculiar to culture are prone to group selection. This idea is the root of our tribal instincts hypothesis. A third possibility is that human propensities to cooperate are a byproduct or accident of some other process. Simon (1990) proposed that human cooperation is a byproduct of our docility and that docility is necessary to take advantage of cultural transmission. Van den Berghe (1981) argued that in small-scale societies cultural similarity in dialect, clothing, and so forth was used as a sensitive marker of genetic relatedness. The relative isolation

of families and bands set up sharp cultural gradients that would measure genetic distance more effectively than innate characters for which the gradient at the small scale is likely to be very small. In the much larger, denser societies made possible by agriculture, people with very similar culture might come to number thousands and, with mass media, millions. Such cultural similarity may trigger kin selected social instincts so that we have unsecured subjective commitments to the welfare our fellow tribals as if they were close kin.

Tests In Five Domains

Sufficient data are available in the literature to make a preliminary test of the competing hypotheses about the nature of human sociality. To be sure, none of the competitors can be entirely ruled out and no doubt both new hypotheses and new data will one day make our exercise here appear naïve. We hope to convince you that the tribal instincts hypothesis is at least worth pursuing, if not frankly the only one of the existing conjectures likely to survive further tests.

Logical Cogency

The tribal social instincts hypothesis is largely inspired by work on mathematical models of cultural evolution. We have modeled five facets of the evolution of cooperation in human societies: (1) the plausibility of group selection on cultural variation; (2) the dynamics of boundary formation in human groups; (3) the role of moralistic punishment in human social systems, (4) the potential for social norms to exert coevolutionary pressures on genes, and (5) the power of indirect reciprocity to support cooperation in large groups.

Models of cultural group selection

We have studied the effects of conformist transmission. In most societies, individuals observe the behavior of many other people, and hence can estimate the frequency of traits in the population. Our theoretical work suggests that imitating the commoner type is adaptive under a wide range of spatially and temporally variable environments (Boyd and Richerson 1985, Chapter 7; Henrich and Boyd 1998). In the models, various learning mechanisms plus selection tend to make adaptive behavior more common than maladaptive behavior. In a world where information is costly and individual learning hence error prone, imitating common behaviors is a simple heuristic that will get you the correct behavior most of the time at smaller cost than subjecting alternative behaviors to costly test. Conformity probably evolved in concert with human capacities for imitation. In theoretical models at least, conformity is an advantage even when reliance on social learning is scant.

Conformist imitation has the byproduct of reducing variation within groups and preserving variation between groups. Once a cooperative variant becomes the commonest

variant in a local group, the conformist effect will favor its further increase by group selection. Once a local group has a given trait maintained at high frequency partly by conformity, rather large rates of migration will not perturb it sufficiently to flip to another trait. This is just the sort of difference from genetic inheritance that in theory should make it possible for group selection to be a strong force. The reason that group selection tends to be a weak force on genes is that migration between groups has a strong tendency to erode variation between them. Conformity solves this problem.

Cultural group selection does not have to result in the physical extinction of losing groups. The process works if groups merely go socially extinct by breaking up and joining other groups as refugees. So long as not too many refugees join any one group, the host group's culture is not likely to change.

The models are quite abstract and do not themselves say anything about the mechanisms by which pro-group altruism will be motivated by proximal psychological processes, such as subjective commitments. They do provide an explanation consistent with folk models of subjective motivations, such as the ones enumerated by Darwin.

Symbolic marking of cultural group boundaries

We have studied models of a processes we term "indirect bias" (Boyd and Richerson 1985, Ch. 8) in which individual imitators use one attribute of potential cultural models to weight that individual in the socialization process. For example, young people pick adult role models on the basis of charm, prestige, or power, and, once a role model is chosen, youngsters may pick up a number of other ideas, norms, skills, and attitudes from that individual. If any of these other traits happens to be correlated with indices of prestige or charm that youngsters are using to choose role models, then the correlated variants will increase in frequency.

The evolution of symbolic, stylistic markers of group boundaries is an interesting special case of cultural evolution under indirect bias. We (Boyd and Richerson 1987) investigated a model of the evolution of "ethnic" markers motivated by these observations. Supposed that there are child and sub-adult phases of transmission. In the child phase, children learn some neutral marker trait, like a speech dialect, from their parents and other local adults. In the later sub-adult phase, they learn a subsistence trait and modify their dialect by selecting among a larger set of adult models. In the first phase children just copy blindly. Sub-adults weight models by both their symbolic trait and their subsistence success. Sub-adult imitators prefer models with a dialect like that they learned as children, but also prefer successful models. The larger set of models in the sub-adult phase is meant to mimic the effects of cultural diffusion from one environment to another; wide-ranging sub-adults are influenced by a much wider social world than children. The question is, in an environment in which the best subsistence strategy is variable from place to place, can a symbolic marker reducing the effect of cultural diffusion of locally maladaptive traits from neighboring environments arise? The answer is yes. If there is a sharp environmental gradient, a dialect difference will emerge and continue to get more extreme until the degree of cultural isolation is sufficient to allow

the population to locally optimize the mean subsistence behavior. Thus, to the picture of a culturally group selected hominid from the previous section, we can also, in theory, imagine that the boundaries between groups are formally marked by symbolic and stylistic changes. Much as in the case of group selection on culture, the evolution of markers of group boundaries is easier than in the analogous genetic case. Pre-mating isolating barriers arise with difficulty under selection. Our ethnic markers model works because of the assumption of two phases of transmission. Although symbolic boundaries arise in this model for ordinary adaptive reasons, their isolating tendency will, like conformity tend to aid the group selection process by protecting any group level variation that arises from the variation reducing effects of migration.

One might think that ethnic boundaries could arise directly to mark groups of cooperators, but this does not seem to be the case (McElreath et al. n.d.). The reason is not far to seek. In a simple world in which cooperation is the only behavior correlated with a marker, selection will strongly favor defectors who carry the marker, deceiving cooperators in order to victimize them. Behaviors for which coordination is important do support the evolution of markers. Coordination involves no dilemma of group versus individual interest; everyone is better off to conform to the common type. Money is an example. Many things—gold, silver, paper, scarce seashells—will more or less equally serve the functions of store of wealth and medium of exchange, but these functions are best served if everyone agrees to use same standard. Games of coordination will favor the evolution of norms and subjective commitment to group norms, especially in complex cases where individuals cannot easily perceive the nature of the coordination solution. If some coordination equilibria are superior to others, group selection will favor those.

Moralistic punishment

Moralistic punishment is the strategy of punishing others who disobey a moral rule and also sanctioning those who do not punish others for breaking the rule. In principle, moralistic punishment strategies could create cooperation in large groups. However, this mechanism will stabilize any norm that becomes common, whether adaptive or not (wearing ties to work is a humble example of the latter) (Boyd and Richerson 1992). Once a moralistic strategy becomes common, those who do not follow the moralistic rule are at a considerable disadvantage. In the pure moralistic punishment model, no force acts to make moralistic rules prosocial. If we suppose that the evolution of moralistic strategies is guided by a significant extent by cultural group selection, then those groups that have prosocial moralistic norms for cooperation will have a considerable advantage over those with no norms, arbitrary norms, or only norms for coordination.

Once more, subjective commitments are a potential proximal mechanism to implement moralistic punishment. In one model we studied, one equilibrium was a mixture of cooperator-punishers and reluctant cooperators who could be coerced into cooperating by a cooperator-punisher. The equilibrium number of cooperator-punishers was enough so that each interacting group on average had about one punisher, just enough to induce complete cooperation in most groups. Even a relatively small minority

of individuals with unsecured commitments to group welfare can move a much larger mass by generating incentives that secure the cooperation of many more. For this to happen, the majority must be rather prone to being coerced into cooperating and punishing or else the costs of punishing to the cooperator-punishers will be too high for this type to evolve at all.

We might call this a system sustained mainly by *weakly secured* commitments. The unsecured commitments of the few can act to secure the commitments of the many, but only if the cost of providing such security is low. Frequency dependent effects are liable to drive up the frequency of defectors in any system in which unconditional cooperation becomes common, so some sort of policing system must evolve to counteract this threat. A commitment to police is itself an altruistic propensity. Moralistic strategies can act to spread the costs of policing very widely by leveraging a small amount of unsecured commitment.

Genes coevolve with culture

Culture can create coevolutionary pressure by social selection against genotypes that are ill adapted to cultural institutions and by favoring ones that are well adapted. We have modeled a case in which males acquire prestige in a culturally determined competition and asked if females will evolve to prefer to mate with prestigious males, even if prestigious males have lower genetic fitness than males who do not invest resources in conforming to prestige norms (Richerson and Boyd 1989). If prestige has an important effect on *cultural* fitness then the evolution of females with a *genetic* predisposition to mate with prestigious males can evolve. As with the punishment model, this process does not intrinsically favor prosocial prestige norms. However, in conjunction with cultural group selection again, we believe that social institutions will tend to be prosocial and so the mate choices and moralistic punishments people make will tend to grant prestige to people with prosocial dispositions and stigmatize those with antisocial ones.

Models of indirect reciprocity

Trivers (1971) described a mechanism whereby long-continued interactions between partners might lead to the development of sufficient trust in reciprocation of acts of aid to make such acts routine. Axelrod and Hamilton (1981) analyzed the case of pairwise interactions of players of prisoner's dilemma in their important contribution to the theory of reciprocity. In their model, the interaction has a given, usually large, probability of continuing for another turn. In this situation, strategies like "tit-for tat," (cooperate on the first round of the game, and then do whatever your partners did on the previous round of the game) easily evolve. If two players of this strategy meet, they cooperate from the first. If tit-for-tat players play against an unconditional non-cooperator, they receive the worst possible sucker's payoff on the first round of the game, but are only victimized once. If payoffs to cooperation are relatively high and games go

on for many rounds, then selection can prevent unconditional defectors from invading a population of tit-for-tat strategists.

Alexander (1987) proposed that Axelrod and Hamilton's result could be extended to very large societies by what he calls indirect reciprocity. If one of us helps you, you may help some third person who in turn helps the other of us, who helps the original helper. Rather than being restricted to pair-wise interactions, perhaps reciprocity can encourage cooperation among large, diffuse networks of reciprocators. We have studied mathematical models of the effects of group size on the evolution of strategies like tit-for-tat. In one series of models, we considered unstructured groups in which all individuals in the group simultaneously played repeated turns of prisoner's dilemma (Boyd and Richerson 1988). We generalized the idea of tit-for-tat to large groups by studying rules of the form "cooperate if k out of the other n individuals cooperated on the last iteration of the game." The tit-for-tat results do not generalize to large groups. As group size increases, the threshold frequency above which reciprocity can increase in a population dominated by unconditional defection rapidly becomes very large. This makes sense. In a situation where interacting groups are of size ten and your rule is cooperate if 5 others do, it is highly improbable the five others with the same rule will be in any given group when rare. Only if such a rule is already quite common can it have a positive payoff. Alexander's idea involves indirect reciprocity flows along fairly stable networks (what goes around eventually comes around). Adding a ring structure to groups to organize reciprocity in larger groups helps, but not much (Boyd and Richerson 1989).

If cooperation does occasionally get started in large groups due to indirect reciprocity, individuals, cabals of relatives, and small-group reciprocators should quickly arise to selfishly appropriate any benefits of cooperation arising in the larger group, causing its collapse. The strength of ties between close relatives and intimate reciprocators should always trump weaker ties to more distantly affiliated others. The model of Nowak and Sigmund (1998) produces cooperation among strangers based on a reciprocity mechanism, but it depends upon each individual costlessly and accurately knowing the "image score" (average propensity to cooperate) of everyone they interact with. Cooperators can selectively interact with other cooperators, but only because implausibly perfect information eliminates the possibility of deceptive signaling. It is also limited to cooperation in pairs of individuals. Thus, so far, the concept of large-scale indirect reciprocity lacks a credible mechanism to increase when rare and to defend itself against the rapid evolution of counter-strategies and false signals of benign intent. We believe that indirect reciprocity has intuitive appeal because in most societies most people do have cautiously benign intent toward strangers, at least toward strangers that do not belong to a hostile group, because group selection has resulted in cooperative institutions and cooperative predispositions. People who do good *are* frequently rewarded by third parties, as the group selection model would predict, without the need for closed chains of reciprocation. Folk individualism gives indirect reciprocity an intuitive appeal not supported by formal modeling.

The modeling work to date suggests that the tribal instincts hypothesis is cogent, and the main competitors suffer serious problems. We can imagine a population evolving social institutions encouraging altruism toward fellow group members, defining what the

relevant groups for cooperation are, and mandating punishment of transgressions of socially sanctioned rules. We may very well be innately adapted to function in societies with such institutions. Having unsecured prosocial commitments can be favored under the circumstances envisioned in these models. Once some unsecured commitment exists moralistic strategies can secure widespread commitment to groups so long as most people are not too reluctant to cooperate. The cultural case is quite different from its genetic analogs where models of group selected altruism and symbolic isolating mechanisms encourage us to think that such things are unlikely to evolve. One of the strongest reasons for doubting that selection among large groups of individuals is an effective force in nature is the narrow range of assumptions that allow genetic group selection for altruism to work in mathematical models. *The same logic does not apply to the cultural case.*

Proximate Mechanisms

Does evidence exist for prosocial impulses such as unsecured subjective commitments to groups and their projects?

Altruistic propensities

A wide range of evidence suggests that humans routinely engage in altruistic behavior toward unrelated and very distantly related people even in the absence of rewards and punishments (Mansbridge 1990). The experimental data on what motivates people to cooperate in social dilemma games, such as laboratory realizations of commons exploitation, is quite extensive (Kopelman et al. n.d.). We focus here on social psychologist Daniel Batson's (1991) wonderful series of experiments designed to distinguish between the "empathy-altruism" hypothesis and competing hypotheses asserting that altruistic behavior results from egoistic motives. According to the empathy-altruism hypothesis, once a potential helper's empathy for a sufferer is engaged, helping behavior is by a genuinely unselfish desire to relieve the victim's suffering. Competing egoistic hypotheses propose that apparent altruists give aid in the expectation of some form of personal reward. Egoistic hypotheses come in many flavors: Individuals may help another to gain rewards or avoid punishment. Rewards and punishments may be external or internal. That is, people may expect others to give rewards or administer punishments, or it may be a matter of conscience, self-administer rewards and punishments. In our terms here, Batson asks if emotionally motivated commitments to aid others exist. Expected external rewards or punishments may be material (soldiers' pensions) or social (enhanced prestige). Batson sought to determine whether fundamentally non-egoistic motivation plays a significant role in decisions to help.

The experiments encourage empathy on the part of experimental subjects, for example by asking them to take the point of view of the experiment's victim, while non-empathetic controls were asked to view the situation objectively. Then, the experimental conditions were manipulated to control for one or another egoistic motivation and to test whether subjects in the empathy condition are still willing to provide aid to the

experiments victim. For example, one egoistic motivation for aiding a victim might be to relieve one's own suffering at having to watch the victim suffer. To test this possibility, "Elaine," the sham victim in one experiment, was to suffer a series of moderately painful shocks. The experimental subjects were told at the beginning of the sham experiment that Elaine is unusually sensitive to shocks due to a traumatic childhood experience. The experimenter expresses concern about this, and offers the real subjects the chance to continue the "experiment" in place of Elaine. The shocks will be uncomfortable for them, but not nearly so painful as for Elaine. If helping is motivated by the desire to avoid viewing someone else suffering, Batson reasoned that allowing the experimental subjects to escape (watch only two trials of the experiment on Elaine instead of all ten) should reduce the tendency to help, whereas if subjects had a genuine desire to help Elaine, even subjects allowed escape should offer to help. In this experiment, difficult escape had a dramatic effect on helping in the low empathy condition, raising the proportion helping from about 0.2 to 0.6. The high empathy condition showed no significant difference in helping; in the easy escape condition the proportion offering to help was 0.9, and in the difficult escape, 0.8. While the egoistic motivation clearly had an effect, the helping in the empathy condition is consistent with the empathy-altruism hypothesis.

Batson even produced evidence that people's desires to aid others go beyond conscience and pride, the most commonly mentioned internal psychological punishments and rewards motivating prosocial commitments. In experiments in which the desire to help was aroused and then frustrated by someone else getting to do the helping, an internal reward system would elevate the mood of those who got to help, but not those that did not. Contrary to this hypothesis, subjects who saw help provided, but didn't have to provide it themselves, had the greatest mood increase, and those that were prevented from helping when no one else did had the lowest mood. People who actually got to help were intermediate. This finding is neatly consistent with our hypothesis that humans experience conflict between individualistic and prosocial motivations. We do not argue that normal humans have the extreme self-sacrificial propensities of honeybees that "think" little of sacrificing their lives to sting an enemy of their colony. Batson's experiments provide ample evidence that people are also motivated by individual interest.

This experiment also suggests that most people have subjective commitments to help those who have engaged their sympathy that go beyond even internal rewards and punishments. People are prepared to take actions that are objectively and subjectively costly to aid others. Those who rescue people from perilous perches and burning houses generally do so with sober determination and often fade away anonymously when the job is done. Publicly recognized heroes often remark that anyone would have done the same, implying that they take no special pride in their act. Few veterans of serious military combat seem to view it as better than a grim duty to be endured, something with no *net* subjective or objective personal rewards.

Batson's findings do not decisively reject individualistic *evolutionary* individualist hypotheses. The subjectively altruistic motivations of individuals might merely have the effect of advertising their reliability and earnestness as reciprocity partners (Hirshleifer 1987; Frank 1988). As always, when signaling models are applied to altruism, we need to worry about advertising a willingness to help without reward in a

world where this trait is liable to make you more false than true friends. The existence of psychological altruism is a serious problem for the pure individualist hypothesis though it may not be fatal.

Kinship

No doubt propensities to cooperate with kin are deeply ingrained in human emotions. One excellent body of evidence comes from the seemingly tangential literature on incest avoidance. Westermarck (1894) suggested that there is an innate avoidance of inbreeding. If so, humans must have an innate kin recognition system. The operation of this device is nicely illustrated by the rarity of marriage among Israeli kibbutz age-mates (Shepher 1983) and the poor success of Taiwanese minor marriages (Wolf 1970). In these famous examples, potential husbands and wives are raised in close companionship as children, much as siblings normally are, even though unrelated in fact. Co-resident age-mates apparently have an innate algorithm that invokes a mating avoidance mechanism. The kin recognition system fails in the rather unusual circumstances discovered by Shepher and Wolf, but in normal families will function properly as an incest avoidance mechanism.

Daly and Wilson (1988) explore a useful set of data on patterns of homicide. Family members, living in close proximity, have the maximum opportunity to kill one another, and family homicides are a large fraction of the total. Nevertheless, there is a striking tendency for consanguineal relatives to refrain from killing each other, compared to affinal family members. For example, child abuses and child murders are very disproportionately committed by step-parents. The homicide data, like that from incest avoidance, strongly suggest that humans have deep-seated psychological mechanisms for kin recognition and for motivating kin appropriate behavior, as predicted by Hamilton's theory of inclusive fitness. Sahlins (1976) argued that Polynesian adoption practices show that human kin behavior is overwhelming modified by cultural practices. However, Silk's (1980) detailed analysis of the ethnographic data showed that Polynesians do generally adopt biological kin whose parents are unable to provide proper care for them. Kin altruism no doubt has deep roots in the vertebrate order, and human examples of nepotistic behavior can be multiplied at will.

These data suggest to us that people are normally quite aware of who their biological kin are. If so, van den Berghe's hypothesized extension of altruism to culturally similar individuals because of erroneous assignment of kinship is implausible. The human subjective commitment to aid kin apparently operates accurately enough to generate real conflicts between loyalties to kin and loyalties to larger groups. Teamsters know that their International Brotherhood is composed of strictly fictive kin, though they may show some *tribal* loyalty to the organization. Thus, we suppose that the frequent usage of kin terms in the context of non-kin groups (fraternity, sorority, etc.) is metaphorical, and that few are fooled (either consciously or unconsciously) about who are kin and who are fellow members of a tribal or quasi-tribal group. More refined experiments are, we acknowledge, desirable to be sure that metaphorical usages tap little real force from predispositions to kin compared to tribal commitments.

Ethnic markers

Larger human groups that cooperate are typically explicitly defined and marked by symbolic boundaries. Some of these markers are relatively simple badges such as styles of body ornamentation or dialects. Others are complex ritual systems accompanied by elaborate belief systems. Such systems usually contain ethical injunctions. Ritual and belief seem commonly to act as vehicles for inducing subjective commitment to group goals (Rappaport 1979; Richerson and Boyd 1989, Hinde 1999). Even in simple hunting and gathering societies, the groups so marked are rather large, as we already noted. In this section we review evidence that that symbolic cultural markers are potent factors dividing ingroups from outgroups, sharpening the boundaries between social units subject to cultural group selection, and regulating subjective commitment and hence altruism.

The “minimal group” experimental system developed by Tajfel (1981) provides insight into the cognitive mechanisms involved in the use of symbols to demarcate groups, and the actions people take based on group membership. Social psychologists commonly find in the laboratory, as in real life, that members of groups favor one another and discriminate against outgroups. Social psychologists in Tajfel’s tradition were interested in separating the effects of group membership *per se* from the personal attachments that form in groups. Turner (1984) contrasts two sorts of hypotheses to explain group-oriented behavior. Functional social groups might be composed entirely of networks of individuals that are linked by personal ties, shared fate, or other individual-centered ties, much as the indirect reciprocity hypothesis imagines. Groups, on this hypothesis, are “some collection of individuals characterized by mutual interpersonal attraction reflecting some degree of interdependence and mutual need-satisfaction.” The contrasting hypothesis is that identity symbols alone are sufficient to induce humans to accept membership in a group, creating positive commitments toward anonymous ingroup members, and neutral or negative ones toward outgroups.

In his prototypical experiments, Tajfel (1981) told subjects that they were participating a test of aesthetic judgment. They were shown pictures of paintings by Klee and Kandinsky, and asked to indicate which they preferred. Then the subjects were divided into two groups, supposedly on the basis of their art preference, but in fact at random. The subject’s task was then to divide a sum of money among members of one’s own group or the other group. Subjects discriminated in favor of the sham ingroup members. Tajfel interpreted these experiments as tapping, in our terms here, unsecured subjective commitments to discriminate in favor of ingroup members and against outgroups. Turner (1984) was interested in whether an extreme case of categorization would generate group-oriented cooperative behaviors. Children were shown their picture paired with others and asked to rate the others as liked or disliked. When they were explicitly grouped into liked or disliked subjects, those led to believe that they were now members of a group of pariah disliked others, discriminated almost as much as liked-group members in favor of their fellow pariahs. In the ungrouped condition, disliked children discriminated in favor of liked others. Turner (1984) argues that such experiments show that even shared membership in a group of unattractive others can induce a commitment to the group (recall classic films like *The Seven Samurai* and *The*

Dirty Dozen, where the plot turns on the bonding among a group of initially hostile outcasts). Categorization *per se* does have a strong effect, independent of inter-personal bonds.

Other social psychologists have objected that Tajfel and Turner have overemphasized the raw categorization effect in interpreting their experiments. Rabbie (1991) argues that no experimental system implying that people belong to a group can control away people's expectation that the group membership imposed by experimenters implies instrumental interdependence. From an evolutionary point of view especially, Rabbie's point is well taken; people presumably only react to symbolic badges of group membership because in the evolutionary past they generally signal politically important social units. In the politically complex world outside the lab, where many groupings are abstractly possible, people no doubt attempt to make sensible decisions about which to take seriously in any given circumstance. Nevertheless, humans are strikingly prone give rather abstract, large, impersonal, marked groups (Protestant Irish, Serb, Jew, German, etc.) great emotional salience that in turn motivates desperate deeds of great risk to participants (Stern, 1995). The experimental evidence and such observations are consistent with the view that humans can develop strong subjective commitments to the symbolically marked groups they are members of and that the symbols motivate behavior in the absence of any personal knowledge of the individuals one is interacting with. They are not consistent with an exclusively individualistic hypothesis of human social commitments. We imagine that common group membership will generate the empathy Batson observes to tap unsecured commitments. This hypothesis ought to be tested.

Prosocial punishment (or reward)

There is no doubt that humans are capable of using rules about appropriate behavior in partners as a basis for social decisions and actions. Cosmides (1989) conducted a series of experiments to test the hypothesis that at least one of the kinds of problems that people evolved to solve is those that involve social contracts. She supposed that human cognition includes the rule "if you take the benefit, then you must pay the cost." Of many simple rules that humans might use in social or more general decision-making this one is uniquely suited to detecting defection in games like repeated prisoners dilemma. She then tested subjects' abilities to solve a logical problem when couched as a social contract compared to their abilities to solve it couched as some simple non-social problem. For example the rule "if a man eats cassava, he has a tattoo on his face" can be framed as a social rule (only men who have undergone the painful ritual of tattooing can eat cassava) or as a mere contingent empirical fact (tribes that eat cassava also happen to tattoo). Framed as a cheater detection problem success rates were in excess of 70%, while less than 25% solved the problem in its empirical guise. Cosmides interprets these results to mean that people have an innate decision-making module devoted to detecting cheaters on social contracts. Whatever one might think of the inference that this data indicates the existence of an innate module, humans certainly appear to be very efficient decision-makers when it comes to detecting defectors on social contracts.

In addition to recognizing cheaters in social games, people seem psychologically prepared to exact retribution even when costs to themselves are likely to be high. Daly and Wilson (1988) report high rates of spousal homicide in some modern communities. Suspicion of infidelity and sexual rivalry are very common motives for murder. Cohen's elegant studies of the Southern culture of honor reported in this volume illustrate how cultural institutions can manipulate the raw biology of emotions to create culture-specific subjective commitments. Southerners are not only more committed to use violence to settle personal disputes, they are also more committed to act violently on behalf of social goals. Southerners are more prone to join the military and more prone to have hawkish views on foreign policy issues than Northerners (Nisbett and Cohen 1996, 2, 63-65).

The capacity of people to be coerced is strikingly demonstrated in experimental settings such as those constructed by Milgram (1974) and Nuttin and Beckers (1975). Experimenters, carrying the institutional charisma of scientists, obtain compliance to quite striking requests. In one of Nuttin and Beckers' experiments, Belgian college students were asked by the experimenters to give arguments in *favor* of a hated exam system to which they were subjected. Virtually all students supported a strenuous protest movement *against* the system. In the most extreme experimental condition used, all 11 students assigned to experimental treatment requesting students to give a television speech favoring the exam system complied with Beckers' request for cooperation. 22 fellow students were asked how many students would comply with such a request, the majority thought less than 5%, and the most cynical guessed 30%!

If the tribal instincts hypothesis is correct, we expect that people will spontaneously act as third party rewarder/punishers under much the same conditions that they will act as ordinary altruists. The literature, to our knowledge, has few studies indicating the extent to which people are willing to punish altruistically. Are some people subjectively committed to punish, at a cost to themselves greater than their expected private benefit, those who transgress social rules? An experiment reported by Fehr and Tyran (1996) illustrates how moralistic punishment might act to permit cooperation in human societies. They used a voluntary contribution public goods game often used by experimental economists. On each round of the game, each of the players was given a sum of money that they could keep or contribute to a common pool. The experimenters doubled the size of the common pool and redistributed it equally to all players, regardless of contribution. Players collectively could earn most by contributing all their resources to the common pool, but contributing players were vulnerable to being exploited by selfish individuals who kept their original endowment, contributed little or nothing to the common pool, but reaped their share of rewards from the suckers who did invest in the common pool. The results of the basic version of this experiment were that initial contributions to the common pool are substantial, 50-60% of their income, but that some individuals contributed nothing. The initial level of trust subjects bring to the game eroded, and contributions to the common pool declined toward zero in subsequent rounds. In some experiments, subjects had the opportunity to anonymously assign punishment points individuals who made small contributions to the common pool, at some considerable cost to themselves. Some subjects did punish low contributors to the common pool and contributions to it rose from initial levels to about 90% of each period's income. Note that second order defection was possible in this experiment; non-

punishers could free ride on the costly punishment of others. Punishing of this type is a form of altruism because it increases the payoff to the group, but not the individual, sufficiently to induce large contributions from those who would otherwise free ride. Despite the lack of security for the commitment to punish in this experiment, sufficient people spontaneously punished to ensure that eventually the group took almost all of the money the experimenters were willing to pay.

More generally, experimental evidence on the well-springs of successful collective action shows that many individuals bring a considerable number of strategies resting on subjective commitment into the laboratory that are quite successful in facilitating prosocial behavior and controlling temptations to defect (Ostrom 1998; Kopelman et al. n.d.). For example, communication, especially communication in the form of subjectively earnest, but objectively “cheap talk,” promises to cooperate in commons games, are as effective as punishment in leading to successful commons management. Ample field observations attest to successful community level management of commons using seemingly the same commitments experimenters find successful in the lab (Baland and Platteau 1996: Part II).

Microevolution

The bread-and-butter of evolutionary biologists is the estimation of the strength of evolutionary forces in wild and laboratory populations. Endler (1986) reviewed the several hundred studies of natural selection in the wild and conducted a meta-analysis of the hundred or so studies he considered sophisticated enough to be included in his sample. Selection is often surprisingly strong. Although analogous studies of cultural evolution are still quite rare, several research programs in historical linguistics, sociolinguistics, organizational ecology, art history, the diffusion of innovations, and demography have converged independently on Darwinian methods and concepts (Weingart et al. 1997: 292-297). More on some of these convergent programs below. The practicality of Darwinian investigations of cultural evolution are clearly demonstrated by these convergent studies even if the range of questions so far tackled is limited. We believe that existing microevolutionary evidence is easier on the tribal instincts hypothesis than its rivals.

The strength of cultural group selection

Soltis et al. (1995) assembled data from the reports of group extinctions by early ethnographers in the New Guinea Highlands. Anthropologists first visited the Highlands just after WWII during the first generation of contact with Europeans. Highland New Guinea societies comprise the only large sample of simple societies studied by professional anthropologists before major changes occurred due to contact with Europeans. Although horticulturalists rather than hunter-gatherers, Highlanders lived in simple tribal societies much as many hunter-gatherers did. (Unfortunately, our sample of hunter-gatherers is far too poor and too influenced by contact with colonial powers to

support a quantitative analysis of group extinction rates. Such societies are, contrary to some romanticized accounts, not usually pacifist, Keeley 1996.) Patterns of intergroup competition were still quite fresh in informants' minds. Many studies report appreciable intergroup conflict and about half mention cases of the social extinction of local groups. Five studies contained enough information to estimate the rates of extinction of such groups. The rate of extinction varies greatly from a few percent to a few tens of percent per generation; ten to fifteen percent perhaps represents the central tendency. The typical pattern is for groups to be weakened over a period of time by conflict with neighbors and finally to suffer a sharp defeat. When enough members become convinced of the group's vulnerability to further attack, members flee to other groups where relatives and friends will give them shelter. On the other side of the coin, successful groups grow and eventually fission. Rates of death in Highland war were not negligible, but neither was the physical extirpation of groups common. The social extinction of groups was rather common, however. In addition to the role we hypothesize for conformist transmission, the fissioning mode of new group formation also tends to preserve variation at the group level compared to a system where migrants from many communities combine to colonize open lands. At the rates of group extinction that characterized Highland New Guinea, evolution of spread of some group selection favored innovation in one group to most of the local groups in a region would take about 40 generations or 1,000 years.

Genes and culture do coevolve

The best-documented example of an organic response to cultural selection pressures is the evolution of adult lactose (milk sugar) absorption in dairying populations (Durham, 1991: Chapter 5). In human populations that lack a tradition of dairying, such as those in Eastern Asia, very few adults retain the ability to digest lactose beyond infancy. The pattern of loss of lactase activity in the guts of adults is the mammalian norm. In those populations with a tradition of dairying, such as those of Western Europe and parts of India and Africa, most adults retain lactase activity. The ability to digest lactase as an adult is transmitted as an autosomal dominant locus. As Durham notes, many other innate characters are candidates for having evolved under coevolutionary pressures from cultural practices. Human societies have apparently had symbolically marked cultural groups for more than 40,000 years (Bettinger, 1991), or about ten times as long as dairying populations have existed. The roots of cultural group selection could go back much further. Ample time exists for humans to have evolved prosocial subjective commitments by coevolution with cooperative cultural institutions.

Group ideologies evolve in the laboratory

Insko et al. (1983) studied the evolution of intergroup relations in laboratory micro-societies. They established groups of four people, removing and adding one person per "generation" to mimic death and birth. In one series of experiments, subjects were given a sham I.Q. test, and subjects with a purportedly higher I.Q. (they were actually given an easier test) were placed in one group while those given the harder test were

placed in other groups. The “smart” groups were also allowed to dominate the model economic system that earned subjects money from the experimenters. The objective of this treatment was to mimic the conquest of one group by another. The sham I.Q. treatment was meant to give subjects in the dominant group a plausible basis for feeling superior to subordinate groups. Over the course of the experiment members of the dominant group did evolve increasingly reassuring rationalizations for their quite unfair treatment of subordinate groups, while subordinate groups evolved counter-strategies of strike, sabotage, and slowdown. The emotions generated by these experiments were quite noticeable in the laboratory and the authors report that they led to one volatile confrontation between participants in a chance encounter outside the laboratory.

The evolution of dialect

Sociolinguists have studied the generation-to-generation evolution of dialect (Labov 1972). One of Labov’s own studies was of the changes in diphthong pronunciation on Martha’s Vineyard. On this dimension, Martha’s Vineyard speech has diverged detectably from New England speech over the last 3 generations. Labov argues that the advent of the tourist industry on the island led to a sense of social distinction between relatively wealthy tourists and working class natives. Natives came to model their speech on the patterns of local fishermen, the most independent and traditional islanders. The fishermen thus came to lead the gradual divergence of Martha’s Vineyard dialect away from regional norms. More generally, dialect evolution seems to be set in motion whenever social cleavages form, resulting in the linguistic marking of many social boundaries. Emotional reactions to dialect variation are quite striking and quite likely to tap subjective commitments. A Black youth stigmatize a recording of speaker of Black Vernacular English as low class, but simultaneously pick the speaker as a likely source of support in a fight, compared to a voice speaking Standard English (Labov 1972, Chapter 6).

The diffusion of innovations

Rogers (1983: 274-277, 321-331) discussed the flow of information about potentially useful innovations in terms of “homophily.” He found strong empirical support for the proposition that most information flows between people who are socially rather similar. This effect creates a barrier that retards the rate of spread of innovations from one group to a socially different one, much as in the models of ethnic markers we described above. Very often “change agents” (extension workers, NGO workers, teachers, health practitioners) are socially remote from their clients and their proffered innovations are ignored.

Henrich (1999) analyzed the time course of many cases of diffusions of innovations in order to test the cultural evolutionary and rational choice explanations for this phenomenon. If innovations spread mainly by independent rational choices, the curve of increase should be R shaped, with the maximum rate of increase at the beginning of

the process when the largest number of rational choosers has yet to adopt the innovation. On the other hand, if innovations spread by cultural transmission, with choice playing a more or less marginal role, then the curve of increase should be S shaped with a maximum rate of spread when the innovation is used by about half the population. The contagion effect of cultural transmission is maximal when adopters and non-adopters are present in equal numbers. Most cases examined exhibited S shapes.

Rational choice theorists often seem in fact to be cryptic cultural evolutionists. For example, Finke and Starke (1992) outline the history of religion in the United States from 1776-1990. The main trends are a steady *increase* in church affiliation rising from 17% of the population in 1776 to 62% in 1980, and a tendency for strict churches to prosper while liberal ones wither. The current success of many Fundamentalist churches relative to liberal Protestant ones is thus part of a long history. Finke and Stark believe two factors explain this change: First, the “free market” for religion in the US as opposed to established churches in our European homeland gives rise to innovative religious entrepreneurs who create churches that are attractive to their parishioners. Second, strong beliefs—often objectively dubious and widely stigmatized beliefs—weed out the lightly committed who are likely to take more than they give to the religious community, making stricter churches better providers of the collective benefits of strong commitments to the community. The explanation may well be true, but the time scales of these changes are measured in generations. For example, it took 80 years for the rather successful Church of the Nazarene to grow from 6,600 to 530,000 members. Demographic data suggest that differential birth rates are as important as joining and leaving decisions in explaining changes in religion in the US (Roof and McKinney 1987, Chapter 5). This pattern is consistent with our picture of individuals inheriting patterns of behavior by cultural transmission, often with some bias, and perhaps modifying them slightly, all the while subject to appreciable effects of natural selection. It is not consistent with standard rational choice theory that has no place for cultural continuity and hence no place for processes with time scales of generations or centuries. More likely, like the Southern culture of honor, the doctrines of strict churches have evolved to create weakly secured and unsecured commitments to the community of faithful.

The evolutionary mechanisms that would favor the proximal mechanism of emotional commitment to group goals apparently exist. On the other hand, few known inter-tribal interactions are sufficiently genocidal to support genetic group selection. Intermarriage, not to mention rape, wife capture, and child abductions, seem to ensure that all ethnic boundaries are genetically leaky while the rapid evolution of dialect and the tendency of cultural transmission to be restricted by cultural boundaries is consistent with the cultural evolution of cooperation. Microevolutionary studies seem to frankly conflict with the idea that social change occurs by entirely rational choice unless rational choice is understood to be a weak process relative to cultural transmission in the construction of individual behavioral repertoires.

Macroevolution

Macroevolution covers the sweep of evolutionary history from the few-generation time scales that begin to elude microevolutionary analysis to considerations of organic change on the geological time scale. Typically, we know little of the details of macroevolution because the fossil and historical records are poor compared to observations of current behavior. On the other hand, over the long run, big changes occur, generating much larger scale natural “experiments” than we can ever hope to conduct on living populations. Four macroevolutionary phenomena provide reasonably sharp tests of the social instincts hypothesis and its competitors.

Rates of evolution due to cultural group selection

Cultural group selection is a relatively slow process if the data of Soltis et al. (1995) are indicative. But then, so are the actual rates of increase in the scale of commitments to group goals we observe in the historical and archaeological records. New Guinea societies were no doubt actively evolving systems (Wiessner and Tumu 1998), yet the net increase in their social complexity during the 11,000 years since the Pleistocene is modest. In the cultural traditions that did lead eventually to the large-scale social systems of our own experience, involving ultimately widespread subjective commitment to groups on the scale of nations, change within any one millennium was modest. If cultural evolution due to group selection appeared to be appreciably more rapid than Soltis et al.’s (1995) estimate, we would have trouble accounting for such facts as the five thousand year lag between the beginnings of agriculture and the first primitive city-states, and another five millennia to get from simple states to modern complex societies.

The uniqueness of tribes

One method of using macroevolutionary patterns to test hypotheses is to comparative natural history. One of the most striking tests of Hamilton’s (1964) theory of inclusive fitness is its high rate of concordance with patterns of ultra-sociality in animals across a wide range of taxa. As E.O. Wilson noted in his 1975 treatise, inclusive fitness theory explains three of the four pinnacles of social evolution quite well—colonial invertebrates, eusocial insects, and non-human mammalian societies. Since he wrote, investigations have uncovered the kin selected, social-insect-like, eusociality of naked mole rat societies. In all species except humans complex societies are built on a foundation of commitment to the welfare of close kin. Human societies have clearly not taken this otherwise universal path to complex sociality (Campbell 1983). We live in small family units that differ little from those of our primate ancestors. Hunter-gatherer bands are not drastically larger or different in degree of relatedness among members than the troops of the more social apes and monkeys (Dunbar 1995). Human hunter-gatherers do differ in typically having cooperation at the tribal scale between residential bands of the same ethno-linguistic group. We know of no close analog of tribes in other species.

The unique features of a species ought to derive from living in a unique niche or in having some historically derived unique feature of their biology. Humans adapt to an unusually diverse array of environments using cultural adaptations. Our unique dependence on culture makes it a plausible candidate to explain our unique form of our social commitments.

This argument is weak because any other unique feature of our biology, such as language or our purportedly extra-ordinary intelligence, is also a candidate to explain our social commitments. What the unique structure of our social systems does do is cast into question explanations that should apply widely to many other species. For example, many explanations for human sociality involve some sort of “green beard” effect (e.g. Frank 1988, Nowak and Sigmund 1998). Such hypotheses, as we noted above, are suspect for not accounting for the possibility of deceptive signals of cooperative intent. If there were a straightforward way for a cheap, honest, cooperative signaling system to evolve, then we should expect that many species should use it, and cooperation on the human pattern should be relatively common. The comparative natural history test thus rules out excessively general explanations of human commitments to tribes and similar groups.

Work-arounds and the evolution of complex societies

Contemporary human societies differ drastically from those under which our social instincts presumably evolved. Until a few thousand years ago humans lived in relatively small, egalitarian societies with a modest division of labor. Typical tribes consisted of a few hundred to a few thousand individuals. Tribal leadership was informal and leaders had only personal charisma to secure commitments of others. An egalitarian ethos was typically well developed. Division of labor by age and sex was important, but family, band and village units were largely self-sufficient except in subsistence or political emergencies. After the domestication of plants and animals, beginning about 11,500 years ago, human densities rose substantially and the potential for an expanded division of labor grew. Beginning about 5,000 years ago, complex societies began to emerge. Hierarchical states arose to administer the increasingly minute division of labor. Families became dependent on the products of strangers for routine subsistence. Leaders came to have great and sometimes quite arbitrary authority to coerce common citizens. Stratification emerged, with elites having highly disproportionate access to power and wealth.

If our tribal social instincts hypothesis is correct, complex societies would have evolved under the constraints and possibilities offered by our evolved social psychology. The rapid social changes of the last few thousand years should throw our social instincts into high relief. Cultural evolution should have produced institutions that conspicuously work around the constraints imposed by a psychology adapted to relatively small scale egalitarian societies. Institutions should evolve to take advantage of the pro-group commitments the tribal instincts make possible and finesse the conflict between egalitarian impulses and the stratification and command and control ubiquitous in complex societies. One of the most striking features of complex societies, including modern societies, is the persistence of tribal scale social institutions and the elaboration

of institutions such as nationalism that utilize mass media to simulate tribes on a larger scale. Business organizations, schools, religions, and government bureaucracies generally contain features that tap or respond to our propensity to commit to tribes or reasonable facsimiles. The persistence of ethnic sentiments in a large-scale modern world that would seem to make them obsolete is an example (Glazer and Moynihan 1975).

We develop this argument in detail elsewhere using the differential performance of armies in WWII as a specific test (Richerson and Boyd 1999). Suffice it to say here that analysts of the performance of WWII armies have discovered striking differences in the fighting power of individual soldiers from different units and appreciable average differences from nation to nation, after controlling for such factors as the quality and amount of equipment available to them. The explanations scholars offer for these differences boil down to more and less effective means of developing unsecured and weakly secured commitments to close comrades and to larger units such as regiments and divisions. Some analysts believe that differences in the level of patriotic commitments to national goals also played a role.

Patterns of Adaptation and Maladaptation

The adaptive consequences of human cooperation, resting in large part on our subjective commitment to our tribes and quasi- or pseudo-tribal groups, are not far to seek. In the small-scale hunter-gatherer societies of our past, cooperation likely furnished aid in emergencies and local social peace (Cashdan 1990, Wiessner 1996). The development of more sophisticated subsistence and social institutions in the last 10,000 years has rapidly made our species the earth's dominant species. In a world where the limitations of kin selection mean that most animal species are (from the view point of mean fitness optimization) maladaptively uncooperative, a cooperative species has many advantages. Since culture also furnishes the means to rapidly evolve new social and subsistence systems, human populations were relatively dense and extremely widespread by the late Pleistocene. Strictly partitioning our success into subsistence and social components is extremely complex since everywhere subsistence production is a highly social activity (Steward 1955; see also Byrne 1997).

One of the most interesting things that a commitment to group goals makes possible is collectively organized cultural evolution in pursuit of group goals and to avoid the impact of natural selection by the activities of proactive institutions (Turner 1995: 134-137). Anthropologist Christopher Boehm (1996) argues that simple societies routinely use more or less formal institutions of discussion and consensus seeking to reach the same ends. In modern complex societies, specialized institutions engage in various parts of the innovation process. Universities and other research institutions create and test new ideas. Marketing systems spread the word. Governments pass laws to implement new ideas (or to forbid their use) based on some assessment of the needs of society as a whole. Think of the effort that the biomedical innovation system mounted to address the AIDS epidemic. Trust in these collective institutions is built via patriotic sentiments and the use of rules that we feel are fair, such as secret balloting to chose leaders. As our feelings of trust reach their limits or as they begin to falter because

experience teaches cynicism, so too does the capacity of collective institutions to function (Fukuyama, 1995). Conflicts between individual, kin and friendship based commitments and group oriented goals are ever-present in human societies and the functionality of tribal and larger scale institutions is always an issue (Edgerton 1992), but the fact that human societies can often successfully use collective action to solve problems is a most striking adaptation consistent with the existence of tribal instincts and the subjective commitments to groups they make possible.

The frequently maladaptive consequences of commitments to tribal and larger scale institutions are also a clear indication of their importance. Departures from group functionality in human social systems are not only due to individual self-interest. A great many disasters result from the poor management of inter-group conflict, often because passionate commitments to the group drive reason from political discourse. The path of Japan to devastation by the United States in WWII is a classic example (Toland 1970). Whether at the scale of nation-states or local street gangs, tribal and tribal-analog loyalties provide social cleavages that easily escalate into lethal violence. Human societies are more or less successful at suppressing intra-societal violence (Knauff 1987), but the inter-societal rule of law remains weak. The most murderous forms of intra-societal violence in modern societies involve civil conflicts between tribal or tribe-mimicking factions. Ethnic conflicts are frequent. Religious communities often engage in conflicts with each other. The abusive rule of upper classes, military elites, and ideological parties is common. Terrorists conduct their violence on behalf symbolically and ideologically marked groups of diverse sorts. The struggles between interest groups in open political systems involve an even more diverse set of groups.

Humans take great pride in fighting on behalf of their groups and are accorded great prestige for doing so. In sports, athletes and fans take up pretend tribal identities, fight mock good fights and nurse sham grudges. In extreme cases like European football hooliganism, the acting out of pseudo-tribal commitments is quite extreme (Buford 1993). Commonly, the admiration of the fan for the superlative performer and other emotions associated with sports are heartfelt. The rewards stars gain as a consequence in such currencies as money and sexual access are substantial. In the hard-nosed business of professional athletics, fortunes are made by exploiting for profit and pay our pleasure in having tribal or tribe-like commitments.

Few men and fewer women will commit murder in pursuit of personal goals, to advance their families interests, or to help a friend, except in defense against murder by another. Those who do kill for such low motives we stigmatize as criminal. However, most men—women have not been so well tested—will kill their group's enemies with relatively little reluctance, without being personally provoked, and at grave risk to their own safety. The military analyst van Creveld (1991) argues that soldiers will remain committed to fighting as long as they *believe* their cause just. However, beliefs are products of culture and cultural evolution can easily lead to conflicts that seem not to be in the objective interests of the fighters. According to Fritz (1995) and Bartov (1991), Hitler and the Nazis, skillfully exploiting a German tradition of anti-Semitism, were able to sustain a weakly secured faith among German soldiers that war on the horrific Eastern Front was a legitimate crusade to save Europe from a Jewish-Bolshevik conspiracy.

Commitment to such an objectively outlandish, morally repellent, and brutally self-destructive goal seems from the diaries and letters soldiers wrote to have played a significant role in sustaining the morale and exemplary performance of German soldiers. Commitment to tribes and larger scale institutions not infrequently serves badly chosen if not utterly wicked ends.

Conclusion

The existence of a tribal level of organization is the most striking derived feature of human social organization. It has no close analog in other animals. It is fundamental to our adaptations to the environments we have lived in. We make our livings in a staggeringly diversity of ways, but a common thread running across the gamut is the use of symbolically marked groups as foci of cooperation, coordination, and the division of labor. The tribal instincts hypothesis proposes that innate human predispositions to commit to their ingroups arose by coevolution with group selected cultural institutions. We are adapted to living in tribes, and the social institutions of tribes elicit strong—sometimes fanatical—commitment. The instincts themselves we think of as being on the model of the principles of the Chomskian “principles and parameters” model of language. The instincts themselves constrain the kinds of societies humans can evolve, but alone are not a complete explanation of our social organization. The nature of the tribes that we commit to, the kinds of commitments we make, and the strength of those commitments all depend upon the cultural traditions that define the group and its institutions. Through the evolution of work-arounds in the last few thousand years, institutions have evolved that recruit the tribal subjective commitment to far larger and very different social systems than the tribe as the concept is understood by anthropologists.

We submit that the totality of the evidence we have reviewed is consistent with the social instincts hypothesis and that its competitors all have serious trouble with at least some of the data we review. Of course, ancillary hypotheses may shore up some of the weak proposals, evidence embarrassing to the tribal instincts idea may be forthcoming from its critics, and competitive hypotheses may be framed in the future. We find it very hard to doubt the existence of unsecured subjective commitments to tribes and their analogs. At the minimum, their *apparent* reality is surely one of the prime challenges for explanations of human behavior.

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