

8

Parochialism Altruism and War

a population can be very successful in spite of a surprising diversion of time and energy into aggressive displays, squabbling and outright fights. The examples range from bumble bees to European nations.

William Hamilton, *Narrow Roads of Gene Land*. (1963[1998]) p. 345

8.1 Introduction

Late nineteenth century scientists as diverse as Charles Darwin (1871) and Karl Pearson (1884) recognized war as a powerful evolutionary force that paradoxically might account for social solidarity among humans and altruism towards the fellow members of one's group.¹ The previous chapter confirmed that inter-group conflict may contribute to the evolution of altruism.

But the idea that altruism would spread by means of war has not been subjected to systematic investigation. When inter-group conflict has been considered, its extent has typically been assumed, as in the previous chapter, rather than explained. While recent contributions have shown that insider favoritism could evolve if they facilitate generalized exchange (Yamagishi, Jin and Kiyonari 1999), or support the higher payoffs that occur when people with similar norms interact (McElreath, Boyd and Richerson 2003), or coordinate the efficient selection of particular ways of interacting (Axtell, Epstein and Young 2001), or improve communication among group members so as to facilitate informal enforcement of prosocial norms, as in the next chapter, the evolution of hostility towards outsiders and other conditions that might account for the distinctly lethal and common nature of human warfare has received little attention.

The importance of insider favoritism in human behavior is well established in experiment, as we have seen in Chapter 3. Other evidence demonstrates that individuals often favor fellow group members over 'outsiders' in the

¹The research on which this chapter is based was conducted jointly with Jung-Kyoo Choi.

choice of friends, exchange partners and other associates and in the allocation of valued resources (Brewer and Kramer 1986, McPherson, Smith-Lovin and Cook 2001). We take as emblematic of this evidence a recent ‘third party punishment’ experiment with subjects drawn from two nearby, but not recently hostile, linguistic groups in Papua New Guinea that revealed strong in-group biases in giving to others, and significantly greater punishment of out-group individuals by comparison to in-group members, who acted ungenerously towards fellow in-group members (Bernhard, Fehr and Fischbacher 2006). We shall return to this experiment in concluding this chapter.

Inter-group aggression and in-group favoritism is similar to altruism in that it is often costly to the individual actor, who incurs mortal risks in a battle, or in shunning others, forgoes opportunities for beneficial coalitions, mating, co-insurance, and exchange. When this is the case, and when in-group members benefit as a result, we term the behavior *parochial altruism*.

But, the struggle for survival of the Norse peoples who settled in Greenland for almost half a millennium prior to their demise around 1400 dramatically illustrates the perils of parochialism. Their hostile relations with the Inuit with whom they uneasily coexisted probably explains why they never learned the boat-building, fishing and hunting strategies that provided the basis for the Inuit survival there even through the Little Ice Age (McGhee 1984). In the absence of positive assortment, neither parochialism nor altruism would seem likely to survive any selection process—whether cultural or genetic—that favors traits with higher payoffs. But, parochial altruism could have emerged and proliferated among early modern humans because our ancestors lived in environments in which competition for resources favored groups with significant numbers of parochial altruists willing to engage in hostile conflict with outsiders on behalf of their fellow group members. These group benefits could have offset the within-group selection against both parochialism and altruism in a manner similar to that studied for simple altruism in the previous chapter.

8.2 Exchange and Warfare among Early Humans

Pleistocene foragers left few archeological traces and the historical record contains few pre-contact histories extending over more than a half a century. The best we can do is to make inferences from the available data. This is limited to what is known about hunter-gatherer demographics, late Pleis-

tocene climate records, archeological evidence on causes of deaths during the Pleistocene, and ethnographic and historical reports on recent foragers. These data suggest that intergroup contact was extensive and that conflict was probably common and lethal. Environmental challenges undoubtedly accounted for additional mortality and group extinction.

As we have seen in Chapter 1, evidence of long distance trade among foraging groups in Africa probably predates the diaspora of modern humans. Exchange was also common among Australian aboriginal groups:

Shell, stone, ochre, *pituri* [a narcotic] and wooden tools and weapons all circulated over hundreds of kilometers...shell pendants crossed the continent....A wooden hooked boomerang was seen...at least 1200 km. west of its area of manufacture. (Mulvaney 1976:80)

Aboriginal cultural practices also were exchanged. One, the Molongo ceremony, apparently traveled 1600 kilometers between 1893 and 1918 (Lourandos 1997:43)

Exchange often involved seasonal meetings of 1000 or more at which 'communal food producing activities included...hunting drives [that] sometimes involved a human circle of 20 to 30 kilometers in diameter....These meetings were most often held close to territorial boundaries so as to avoid trespass and therefore further conflict (Lourandos 1997:65).

Nor were the aboriginal Australians atypical in this respect. Many groups of modern foragers meet in seasonal groupings of quite large aggregations of bands, constituting sometimes many thousands of individuals (Binford 2001, Kelly 1995). Exogamy also promoted contacts with strangers. The average distance between the birthplaces of husbands and wives among hunter gatherers in tropical areas reported in MacDonald and Hewlett (1999) is 40 km, and much greater for some hunter gatherers, such as the !Kung (70 km) and Arctic peoples (Fix 1999). Among the ("pure") !Kung groups studied by Harpending and Jenkins (1974) only 58 percent of the parents of the fertile adult members of the population were born in the same group as their children. These high levels of mobility, also noted in other Southern African groups such as the Hadza (Woodburn 1982), arise in part from the far-flung coinsurance networks, that among the !Kung may include partnerships well

over 200 kilometers distant. For example, describing the likely historical patterns of the Dobe !Kung, Howell (2000):11 writes:

The pattern of frequent long and short distance migrations, utilizing widespread kinship ties, must be an old pattern, with living groups forming and dissolving, coalescing and splitting to adjust groups size to the resources available. While no or few individuals may ever have covered the whole !Kung range during a lifetime, nearly every individual can be expected to travel long distances, living in a number of places and encountering a wide range of other !Kung, even if always in relatively small groups.

It seems safe to conclude that all but the most isolated forager groups typically benefitted from relations with other groups.

Turning to evidence on group conflict and extinction, frequent catastrophic mortality (due to conflicts, environmental challenges and other causes) is the most plausible way to reconcile two pieces of solid evidence about hunter-gatherer demography (Keckler 1997). First, human population grew extraordinarily slowly or not at all for the 100,000 years prior to 20,000 years before the present with estimated growth rates ranging from .002 percent per annum in the earlier period to 0.1 percent in the later (Bocquet-Appel, Demars, Noiret, and Dobrowsky (2005);Cohen 1980). Yet, models and data on hunter-gatherer demographics show that they are capable of growth rates in excess of 2 percent per annum (Birdsell 1957, Hassan 1980, Johansson and Horowitz 1986).

Evidence of late Pleistocene climate variability is presented in Figure 8.1. Deep sea cores in the Western Mediterranean and other data suggest that the climate variability shown in the figure was a general northern hemisphere phenomenon (Martrat, Grimalt, Lopez-Martinez, Cacho, Sierro, Flores, Zahn, Canals and andand David Hodell 2004) Surface temperature scales approximately linearly with the $\delta^{18}O$ signal shown in the figure. Differences in temperature (Centigrade) are about 1.2 times the difference in the signal shown the figure (Johnsen, Dansgaard and White 1992). Even these data (smoothed to 50-year averages to reduce measurement error) indicate that changes in mean temperature as great as 8 degrees (C) occurred over time spans as short as two centuries. By way of comparison, the Little Ice Age that devastated parts of early modern Europe experienced a fall in average temperatures of one or two degrees, and the dramatic warming of the

last century raised average temperatures by one degree, comparing the unprecedentedly hot 1990's with a century earlier (Mann, Bradley and Hughes 1998, McManus, Oppo and Cullen 1999) In light of the climate record Boehm (2000):19 writes that:

...towards the end of the Pleistocene as anatomically modern humans began to emerge, group extinction rates could have risen dramatically as needy bands of well armed hunters, strangers lacking established patterns of political interaction frequently collided, either locally or in the course of long distance migration.

A statistical analysis of recent ethnographic evidence is consistent with Boehm's conjecture. Ember and Ember (1992) conclude that a "history of unpredictable natural disasters strongly predicts more war...people, particularly in non-state societies, may try to protect themselves against future disasters by going to war to take resources from enemies."

The impact of climate variation is also suggested in the archaeological record. Commenting on a burial from 12 to 14 thousand years ago in which almost half of the skeletons indicated a violent death, Wendorf (1968):993 explained:

Population pressures may have become too great with the deterioration of Late Pleistocene climate and the effects which this had on the herds of large savanna type animals which were the primary source of food at this time. ...a few localities which were particularly favorable for fishing would have been repeatedly fought over as sources of food became increasingly scarce.

Archeological evidence on Southern Californian maritime hunter-gatherers over a 7000 year period indicates that violent deaths occurred disproportionately during periods of climatic adversity and resource stress (Lambert 1997). The archeological evidence is summarized in Table 8.1.

Drawing inferences about the frequency and intensity of group conflict from these data face three main problems. First, as with most archeological data, it is impossible to establish if the sites that have been studied are representative of late Pleistocene and early Holocene conditions. Second, while some burial evidence is suggestive of ongoing intergroup violence (simultaneous burials and healed forearm injuries, for example) one cannot

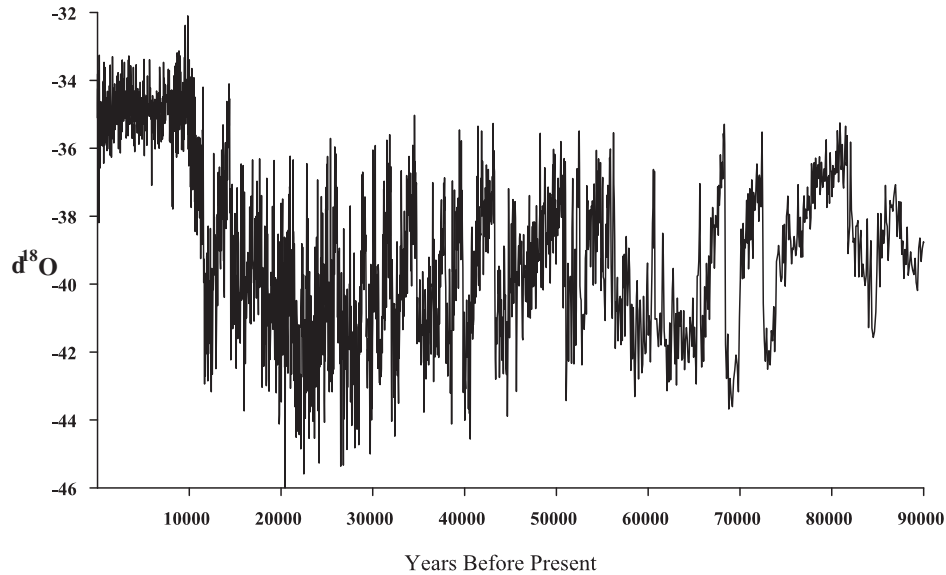


Figure 8.1. Pleistocene temperature variations. Shown are measures of $\delta^{18}\text{O}$ taken from Greenland ice cores (from http://www.glaciology.gfy.ku.dk/ngrip/index_eng.htm and described in North Greenland Ice Core Project Members (2004)).

readily distinguish between deaths due to intergroup violence that occurring within groups. Third, many deaths in warfare do not leave projectile points embedded in bone or the other traces of violent death used in these studies, because “the most deadly injuries are those to the thorax and abdomen, wounds that often do not involve bone.” (Lambert 1997):92 As a result most data are underestimates, a possibility mentioned by many of the authors (e.g., Wendorf 1968:993) and judged to be significant in magnitude in one case: “an analysis that included only projectile points embedded in bone would miss over half of the projectiles...and 75% of what was in all probability the actual number of projectile wounds.” (Lambert 1997):93.

The final problem is compounded because fatalities during combat may fall far short of the total when the displacement of the surviving losers is

Site (source)	Date	%	Comments
N. British Columbia Cybulski (1994)	3500BC– 1774AD	21.8	Incl North and South, all dates
Nubia Wendorf (1968)	12,000 ybp	24.1 a	Adults (site 117 and ‘Qadan’)
Ukraine (Vasylivka) Vencl (1991)	Mesolithic	15.9	Based on Telegin (1961)
S. California Lambert (1997)	3800BC- 1380AD	7.5	Excluding later ‘chiefdom’
Central California Moratto (1984)	1500BC– 500AD	≥ 5.0	Points embedded in bone only p. 183
Denmark (Vedbaek) Price (1985)	4100BC	13.6	“affluent foragers”
Sweden (Sketeholm I) Price (1985)	4300BC	≥ 3.8	Points embedded only

Table 8.1. Fraction deaths due to war: archeological evidence. We have included British Columbia and Southern California data for all relevant periods and geographical areas and averaged the data from the Qadan burial with that of Jabel Sahaba, resulting in substantially lower estimates that reported in Keeley (1996)

accounted for. Here is Alexis de Tocqueville’s (1954, volume 1 p. 352) account of the retreat of the Choctaws across the Mississippi:

It is impossible to conceive the frightful suffering that attended these forced migrations. They are undertaken by a people already exhausted and reduced; and the countries to which these newcomers betake themselves are inhabited by other tribes which receive them with jealous hostility. Hunger is in the rear, war awaits them, and misery besets them on all sides. [I] was the witness of suffering that I have not the power to portray.

Among the warring Mae Enga in the New Guinea highlands, collateral mortalities were also significant. Meggitt (1977):112 writes of

the sudden and forced movements of women and children, the elderly and the ill, over difficult terrain in bleak and often wet weather. We simply do not know how many infants and old people succumb to pneumonia in these flights, how many refugees

are drowned when trying to cross boulder-strewn torrents, how many sick and weak people die because food supplies are interrupted. These less obvious costs of war...accumulate significantly through time.

The average fraction all deaths due to violence of the sites in Table 8.1 is 13.1%. This compares with estimates well below one percent of male deaths for Europe and the U.S. in the 20th century, three percent of all deaths for 19th century France and two percent of all deaths for Western Europe in the 17th century, a period of virtually continuous conflict (Keeley 1996).

But, it is considerably below the third of all deaths due to warfare estimated from ethnographic data for the pre-contact (before 1970) Aché in Paraguay (Hill and Hurtado 1996). Ethnographic studies of intergroup conflict allow estimates of the annual deaths due to warfare averaging one-half of one percent for the seven hunter-gatherer (not including the Aché) reported in Keeley (1996):195. This may be compared with the archeological evidence above: assuming a demographically plausible generation length (25 years). In this case four percent of the (steady state) population dies annually so the ethnographic estimate indicates that 12.25 percent of deaths are due to warfare. Including the Aché data just mentioned raises the average to 14.9 percent.

Table 8.2 summarizes the available surveys, based on ethnographic sources. These data may understate the extent of group conflict in the Pleistocene and early Holocene because some of the communities shown to make war rarely or not at all are under the administration of modern nation states or have suffered defeat in war and consequent subjugation by other dominant (non-state) groups. In these data sets there is no significant correlation of warfare with population density, food storage, hierarchical political structure, and degree of inter-group mobility (Ember and Ember 1997, Keeley 1996, Kelly 2000).

One cannot generalize about the likelihood during the Pleistocene and early Holocene of lethal group competition and the advantages that more altruistic groups may have had in surviving these and periodic environmental challenges. The far-flung settlements of the circumpolar regions, western Australia and Tasmania, for example would be far less likely to be in contact—either conflictual or beneficial—than groups living in closer proximity such as those in South eastern Australia and lowland South America. Likewise, periods of climatic volatility would be more likely to bring groups into conflict. But, taking all of the evidence into account it seems likely for

Source	Contin- uous	Fre- quent	Rare	<i>N</i>	Comment
Otterbein (1989)	20	50	30	10	“constant”
Kelly (2000), based on Ross (1983)	24	48	28	25	external and internal
Ember (1978)	65	25	10	31	including ambush

Table 8.2. Warfare in hunter-gatherer societies. Note: The table shows the percent of all *N* groups with each degree of frequency of warfare. Continuous is defined as (for row 1) “constant” meaning “annual;” (For row 2): both internal or external warfare occurs ‘at least every five years,’ and one of these occurs “at least yearly”; and (for row 3) “more than once every two years.”

many groups and for substantial periods of early human history group conflict for survival may have been frequent. Could parochial altruism have emerged and proliferated in this environment?

8.3 Parochial Altruism and War

We model a population of foragers who engage in both within- and between-group interactions in which individuals may adopt two types of behavior: altruism and parochialism. Recent neuro-imaging studies show that altruistic behaviors activate reward circuits of the brain (Fehr and Kosfeld 2005, Rilling et al. 2004) while exposure to unfamiliar “outsiders” activates regions of the brain associated with fear or hostility (Phelps et al. 2000). Because the cognitive and emotional processes motivating parochialism and altruism appear to be quite distinct, we model them as separate, independently evolving behaviors.

There are thus four behavioral types: parochial altruists, tolerant (non-parochial) altruists, parochial non-altruists, and tolerant non-altruists. Parochials (of either type) are hostile towards members of other groups. But only parochial altruists engage in combat, as the non-altruists do not bear personal costs in order to confer benefits on their fellow group members. In the absence of between-group hostilities, tolerant members of a group benefit from inter-group exchange, risk pooling and the kinds of mutually advantageous interactions with other groups mentioned above.

Two types of selection are at work in the model. Within group selection favors tolerant non-altruists and tends to eliminate parochial altruists (as well as tolerant altruists and parochial non-altruists). By contrast, selective extinction resulting from inter-group conflict may favor parochial altruists. In order to clarify the role of war, parochialism and selective extinction, we do not model the other mechanism by which altruism may spread, namely, selective emigration (Rogers 1990). Thus, in contrast to Maynard Smith's haystack model and Wilson's model of trait groups, in the absence of territorial expansion, highly altruistic groups in our model do not contribute more replicas to the next generation (Maynard Smith 1964, Wilson and Dugatkin 1997). Like the model in Chapter 7, our setting is quite unfavorable for the evolution of altruism as it is equivalent to models in which local density-dependent selection exactly offsets the group benefits of altruism (Taylor 1992, Wilson et al. 1992).

Parochial altruists do receive a direct benefit if a war occurs, as they share in their group's increased probability of surviving a hostile encounter that results from their status as a 'fighter' (relative to the group's likely survival had the individual been of another type.) For plausible group sizes and frequencies of conflict, however, this direct benefit is an order of magnitude smaller than the costs. In every generation, at a cost of c , altruists (A 's) contribute to a public good whose value (b) is shared equally among the n adult group members. The public good may be common defense and predation, food sharing or similar behaviors that confer benefits on all group members. Those who are not altruistic (N 's) do not contribute. Because $b > c > b/n$, contributing raises group-average payoffs but reduces the contributor's payoffs and so is both group-beneficial and altruistic. Not contributing is the dominant strategy, the N 's payoffs exceeding the A 's by the amount c , irrespective of the distribution of A 's within the group. Payoffs in the absence of group conflict are described in Table 8.3.

In every generation each group interacts with another group either cooperatively or in a hostile manner (see Figure 8.2). Hostility in an inter-group interaction results if the fraction of parochial members (P) of at least one group is sufficiently great. The probability that a group survives a hostile interaction is increasing its number of fighters (parochial altruists) relative to the number of fighters in the opposing group. The use of force between the two groups occurs when one is sufficiently likely to win, reflecting the fact that as with other primates, evenly matched human groups seek to avoid costly conflicts (Wilson, Hauser and Wrangham 2001). If a conflict occurs,

	Parochials	Tolerant
Altruist	$bf_i^A - c$	$bf_i^A - c + gn_j f_j^T$
Not Altruist	bf_i^A	$bf_i^A + gn_j f_j^T$

Table 8.3. Expected Payoffs to Four Behavioral Types in the Absence of Hostile Between-Group Interactions. The fraction of group i who are altruists is f_i^A . All members receive the benefit of the public good, bf_i^A . Tolerant players of both types receive the benefits of non-hostile group interaction, $gn_j f_j^T$ where g is the benefit of non-hostile group interaction, n_j is the group size of the other group, and f_j^T is the fraction of the other group who are tolerant. For our simulations, benchmark values of the parameters in the table are: $c = 0.01$, $b = 0.02$, $g = 0.001$, $m = 0.3$, $\mu = 0.005$, and average group size is 26 members per generation.

a fraction of the members of the losing group are eliminated (the fraction eliminated is a constant f_e times the between-group difference in the fraction of parochial altruists) and replaced by replicas drawn randomly from the winning group. Hostile inter-group interactions in our ancestral past may have more ongoing and less episodic than we model here, but taking account of this would not alter the causal mechanisms of the model.

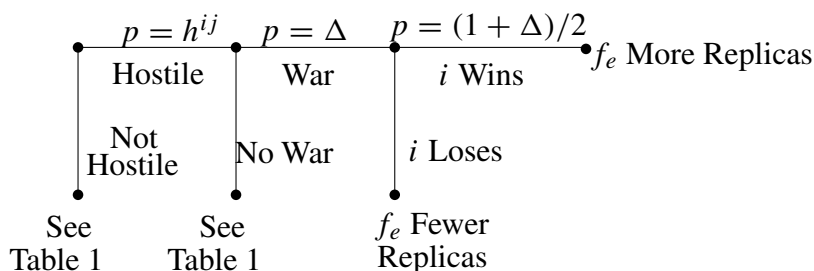


Figure 8.2. Between-group Interaction (see text). Notation: f_i^T, f_j^T is the fraction who are tolerant in groups i and j , respectively; $h^{ij} = 1 - f_i^T f_j^T$ is the probability that an interaction between groups i and j will be hostile; f_i^{PA} is the fraction who are parochial altruists in group i ; $\Delta = |f_i^{PA} - f_j^{PA}|$ is the probability that a hostile interaction will result in war, and $f_e \Delta$ is the fraction eliminated from the losing group ($f_e = 2$ in our benchmark simulations).

If the interaction is not hostile, each tolerant (T) member receives a net benefit from each tolerant member of the paired group resulting from gains

from trade or risk pooling. Parochials receive no benefits of this type. As a result, in the absence of war the expected payoff to the T 's in a given group exceed that to the P 's irrespective of the fraction of T 's in the group, so T is the dominant strategy. This is why both A 's and P 's face adverse within-group selection.

The process by which intergenerational transmission of behaviors takes place could be cultural, those with higher payoffs being disproportionately copied by the next generation, or genetic, payoffs measuring reproductive success. Every generation, members of each group are paired randomly to produce offspring, whose expected number is proportional to the parental couple's share of the group's payoffs. So as not to favor the hypothesized co-evolution of parochialism and altruism, which depends on the two behaviors being statistically associated, we assume an intergenerational transmission process with a strong tendency for the behaviors to be separated. Thus we assume no assortment in mating and we allow complete recombination, so that a parental couple composed of a PA and a TN will have offspring of all four behavioral types with equal probability. Additionally, this process is modified by mutation: with some probability μ each member's offspring inherits a strategy randomly from the four possible types independently of the parental types. With probability $1 - \mu$ the non mutational replication above takes place. Each generation, with some probability m each member migrates to a randomly selected group.

With some probability (μ) each member's offspring inherits a strategy randomly from the four possible types. With probability $(1 - \mu)$ in each generation each member produces replicas in proportion to their share of total payoffs in the group. This replication process reflects the assumption that all sites are saturated so that a group's population can grow only if it increases its carrying capacity by territorial aggrandizement. The replication process could be cultural (those with higher payoffs are disproportionately copied by the next generation) or genetic (payoffs measure clonal reproductive success). Each generation, with some probability (m) each member migrates to a randomly selected group.

8.4 Results

The agent-based computer simulation explored its properties of this model under a range of parameters calibrated to resemble the environment of late Pleistocene and early Holocene humans. Figure 8.3 shows that over a very

long period, the simulated population spends most of the time in states with many parochial altruists and few of the other three types, or in states with many tolerant non-altruists and few of the other three types. In the former case, high levels of parochialism in the population sustain a high level of conflict among groups, thereby maintaining a substantial fraction of parochial altruists in groups. This replicates the synergy between war and altruism in Chapter 7 (see Figure 7.4). By contrast, when the population is in the states in which tolerant non-altruists are prevalent, few wars occur. As a result the within-group selection pressures against parochials and altruists predominate, maintaining only a low level of each.

In this model, parochialism and altruism evolve not because the parochial altruists deliberately associate with like types, but rather because within-group interactions for which cooperation is possible are characterized by positive assortment. Parochial altruists are more likely to be paired with other parochial altruists than under population-wide random matching, while hostile interactions are characterized by negative assortment: the wars in which most parochial altruists participate (and win) tend to be against groups with larger fractions of the other three types. When the number of parochials in the population is sufficient that such hostile conflicts are frequent, the result is to favor the proliferation of both altruists and parochials. Similarly, when tolerant individuals are prevalent in the population they benefit from positive assortment in cooperative interactions because most are in groups that reap benefits from peaceful intergroup relations.

The vector field in Figure 8.4 gives an approximation of the explicit dynamics of the underlying Markov process. Each arrow gives the direction of expected movement for a population whose composition is indicated by the root of the arrow. The longer arrows indicate strong selection against parochials in the absence of significant frequencies of altruists and against altruists in the absence of significant frequencies of parochials. Statistical analysis of very many generations in which the population is near point *b* in the figure indicate that both altruism and parochialism are sustained by levels of inter-group conflict and deaths in warfare considerably below estimates just reviewed from archeological and ethnographic data relevant to late Pleistocene and early Holocene conditions. We are therefore quite confident that our results do not require implausibly high levels of between-group hostility. Figure 8.5 illustrates the transition process between states close to *a* and those at *b*.

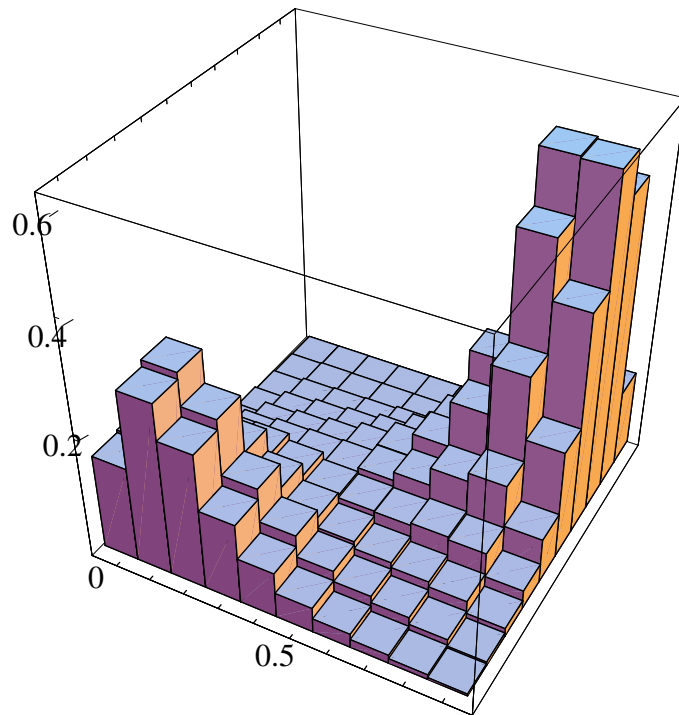


Figure 8.3. Parochial-altruist and Tolerant Non-altruist Outcomes Occur with High Frequency. The parameter values are as described in the legend of Figures 8.2 and 8.3. The height of the bars gives the fraction of a very long period in which we observe the indicated pair of population level frequencies of altruists and parochials in the population. These frequencies are an approximation of the stationary distribution of the underlying stochastic Markov process implied by our model and have been recovered from a very large number of implementations of the model with initial seeds at every state in the state space.

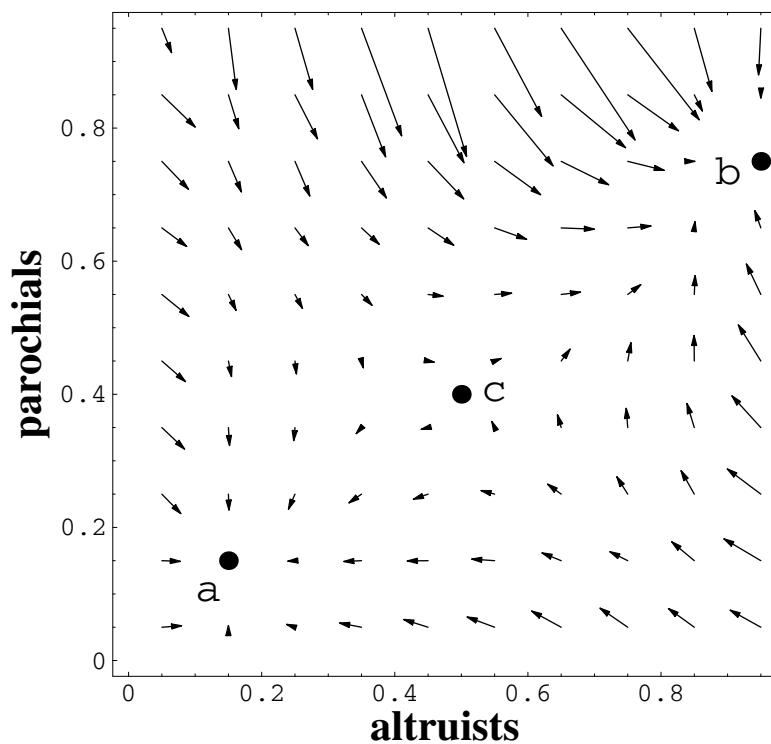


Figure 8.4. Probabilistic Transition Dynamics. The parameter values are as before. Each arrow represents the expected change at each state, based on a transition matrix recovered from the underlying Markov process as described in the previous figure legend. Asymptotically stable states occur where both frequencies are approximately 15 percent (point A) and in the neighborhood of the frequencies of A and P equal to (0.95,0.75), and point B. Point C is a saddle (unstable critical point).

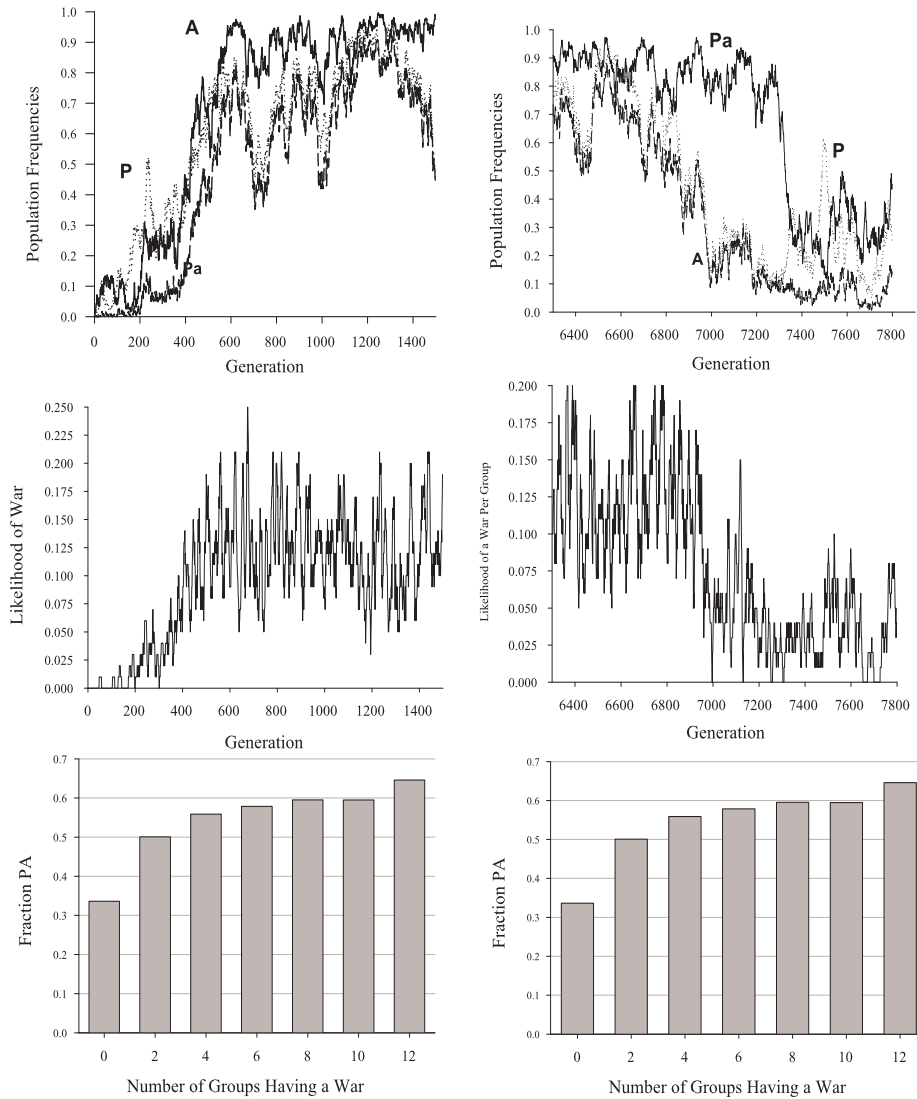


Figure 8.5. The top panels illustrate transitions between states similar to A and B in the previous figure. The middle and bottom panels show that high levels of P and A sustain high frequencies of warfare and vice versa. Wars are most frequent when about half the population are parochial altruists, because at these frequencies imbalances between groups are more common.

In an appendix we explore the sensitivity of these results to variations in the parameters. The frequency of parochial altruists and of war varies inversely with group size and the migration rate because these population structure parameters diminish the between-group differences in the distribution of types, thereby weakening the effects of selective extinction. The parameters affecting within group and between group selection also have the expected effect: war and parochial altruism vary positively with the extent of losses inflicted on losers (l) and inversely with both the benefit from non-hostile interactions (g) and the cost of altruism (c).

The explanation of the evolution of parochial altruism outlined here also provides a plausible explanation of the results of the experimental third-party punishment experiment in Papua New Guinea mentioned at the beginning of the chapter. Suppose that the experimental subjects pool comprised the four behavioral types in our model. Tolerant altruists are expected to bear costs in order to give to both insiders and outsiders, and to punish those who violate norms. In view of the importance of mutually beneficial intergroup relations, punishment of norm violators by altruists would include out-group members as well as insiders. But parochial altruists would give preferentially to ingroup members and punish those who harm group members more severely than if the victim is not an insider. Our model shows that this spiteful behavior towards outsiders could have evolved by benefitting other group members in hostile intergroup contests. Note that in the experiment the punishment of an outsider increases the relative payoffs of the actor's group as the punishment is three times the cost to the punisher.

Other evolutionary influences may also be suggested by the experiment: the fact that group members are likely to be somewhat more genetically related to insiders than to outsiders might be part of the explanation of group favoritism in giving. But this could not explain giving itself in a non-repeated interaction. The reason is that in the experiment the benefit conferred by the gift is fully offset by the cost to the giver and so could not have evolved by kin selection (that is, $b = c$ in the terms of equation 4.1), Hamilton's rule for kin-based altruism, which in this case would require that for giving not to be inclusive fitness reducing the giver and receiver would have to be genetically identical, and even then the giving would be simply selectively neutral! Moreover, neither individual or kin selection can explain the punishment of norm violators, or the more severe punishment of outsiders, assuming the ancestors of these experimental subjects lived in groups of the general size of our foraging forebears.

8.5 Persistent Parochialism

Though its origins thus may lie in Pleistocene and Holocene warfare, the persistence of parochial hostility to “outsiders” in modern politically liberal and economically competitive societies is something of a puzzle, because in addition to the disabilities associated with limited gains from trade and economies of scale, these sentiments are often condemned for the racism, religious intolerance and other repugnant forms that parochialism sometimes takes.

To address this puzzle in Bowles and Gintis (2004b), we studied *parochial networks*, defined as sets of individuals unified by similarity of one or more ethnic or other ascriptive characteristics and engaged in non-anonymous interactions structured by high entry and exit costs, but lacking a centralized authority, drawing on the works of Homans (1958), Ben-Porath (1980), Iannaccone (1992), Kandori (1992), Greif (1994), Akerlof (1997), Pagano (1995), Bénabou (1996), Durlauf (1996), Kranton (1996), Taylor (1997), and Glaeser (2000). In this model, parochial sentiments persist, despite the associated costs, because within-group cultural diversity may make the informal enforcement of contracts and other aspects of cooperation more difficult. It thus bears a strong affinity with the class of economic models of Phelps (1972), Arrow (1973) and others who sought to understand how beliefs supporting discriminatory behavior could persist in competitive equilibrium.

Modern day parochial networks often do quite well economically, as the flourishing informal ethnic business linkages among new immigrants to the United States and the United Kingdom attest (Rauch 1996, Granovetter 1985, Kotkin 1993). For instance, Cambodians run more than 80 per cent of California’s doughnut shops, raising funds from friends, family, and ethnic credit associations (Kaufman 1995). Similarly, Indians own more than a third of the motels in the United States, frequently raising initial capital through unsecured loans from extended family members (Woodyard 1995).

When interactions among group members are characterized by material payoffs that take the form of prisoner’s dilemma, public goods or other social dilemmas, parochialism may contribute to successful cooperation in three ways. First, members may feel more altruistic toward the ethnically similar members of their group than towards “outsiders.” As we have seen in Chapter 3, if each member values the payoffs gained by other members sufficiently highly, mutual defect is no longer the dominant strategy equi-

librium of these interactions, and mutual cooperation may be a stable Nash equilibrium.

A second way that cultural affinity could support cooperation is by enhancing the force of altruistic punishment that often sustain cooperation in experimental public goods games. For example, it is plausible that the shame induced by criticism for selfish behavior, studied in Chapter 10, is greater when the critic shares the defector's norms about good behavior.

The third reason parochial groups may cooperate in interactions that would take the form of prisoner's dilemmas or public goods games in non-parochial settings, unlike the first two reasons, does not concern the members' preferences. Rather it is the effect of cultural affinity on the information structure of the interaction, allowing equilibrium strategies unavailable in the information environments of less parochial groups. This third reason for the success of parochial networks receives strong support from a series of remarkable experiments conducted in the slums of Kampala, where there is considerable evidence that more ethnically homogeneous communities sustain higher levels of cooperation than do more heterogeneous neighborhoods. The authors (Habyarimana, Humphreys, Posner and Weinstein 2007) report that:

successful collective action among homogeneous ethnic communities...is attributable to the existence of norms and institutions that facilitate the sanctioning of non-contributors. We find no evidence for a commonality of tastes within ethnic groups, for greater degrees of altruism towards co-ethnics or for an impact of shared ethnicity on the productivity of teams.

Our analysis of parochial networks explores the superior sanctioning and norm enforcement capacities of parochial groups and their resulting success in surmounting social dilemmas. The mechanism for the success of parochial networks is their ability to promote *trust*. Our model develops insights provided by a number of contributions to the sociology of networks, many of them stimulated by Granovetter (1985):

...social relations, rather than institutionalized arrangements or generalized morality are mainly responsible for the production of trust in economic life. (pp. 490-491)

But like parochial foraging groups, modern parochial networks generally face offsetting costs including foregone gains from trade and economies of scale and the inability to exploit productive diversity (Page 2007), as when

different groups have complementary skills or face uncorrelated shocks, making partnerships for production or co-insurance mutually beneficial. The advantages of trade with those deemed “outsiders” is a common explanation of the permeability of network boundaries in small scale societies (Adams 1974) and of the extinction of very restrictive networks in favor of more inclusive entities (Gellner 1985, Weber 1976). Ben-Porath (1980) develops similar reasoning concerning the economic capabilities of families and other face to face networks:

The transactional advantages of the family cannot compensate for the fact that within its confines the returns from impersonal exchange and the division of labor are not fully realizable. (p. 14).

A particularly well-documented example of this tension is Greif’s (1994) account of how the competitive advantages stemming from the superior within-network contractual enforcement capabilities of the tight-knit 13th century community of Maghribi merchants was eventually offset by their reduced ability to engage in successful exchange with outsiders, resulting in their inability to compete with the more individualistic Genovese traders.

People, of course, do not normally express their identification with parochial networks in terms of their economic advantages. Rather, they typically invoke religious faith, ethnic purity, or personal loyalty. The contribution of parochial sentiments and practices to economic performance of groups is far from the sole reason for their persistence. Ethnic, racial and other group identities arise and persist for a multitude of reasons, many of them far less benign than those studied here. Loury (2001) and Glaeser (2005) provide accounts of some of these reasons. Explicit socialization into parochial preferences is commonly part of the oblique cultural transmission process studied in the next chapter.

8.6 Conclusion

Our approach thus explains how *Homo sapiens* could have become a uniquely war-like species and the status of parochial altruism as a common and enduring suite of human behaviours. Related evolutionary explanations of why group boundaries so powerfully influence human behavior are found in McElreath et al. (2003) Axtell et al. (2001), Nettle and Dunbar (1997), and Hammond and Axelrod (2006).

The fact that altruism and parochialism may have a common evolutionary origin, whether cultural or genetic, does not mean that the two are inseparable. Examples of tolerant, even anti-parochial, altruism include some inter-group behavioral experiments (Bouckaert and Dhaene 2003), the electoral support in many countries for tax-supported economic aid to the people of poor nations, and the participation of people of all ancestral groups in political movements against racism. Evidently human behavior is subject to deliberate processes of socialization and learning that are capable of supporting tolerant altruistic behavior. The importance of socialization in human behavior, and our unique capacities to learn and internalize norms remains to be explained.