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Group Selection and the Origins of Evil

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IN THE SPECIAL ISSUES OF SKEPTIC on evolutionary psychology and ethics a few years back (Vol. 3, No. 4, 1995 and Vol. 4, No. 1, 1996), John Hartung argued that the world's most enduring religions are essentially xenophobic. By this he meant that these religions are designed to promote harmonious relations only among their followers' in-group. Hartung argued that every historically successful religion must have been xenophobic because the values of enduring religions must be consistent with natural selection, and natural selection could never promote out-group generosity. The reason, Hartung insists, is that natural selection is only sensitive to differences in the reproductive output of individuals and their lineages and never sensitive to differences among groups. The question appears again in the last issue of SKEPTIC with the review of the new book by Elliott Sober and David Sloan Wilson, *Unto Others*, defending a modified group-selection model.

I am sympathetic to critics of group selection like Hartung because of what I take to be their concern about a dangerously naive one-worldism in political philosophy associated with group selection (Hartung, 1996). The argument goes roughly like this: *if* group selection is admitted as one of the possible means by which human social behavior may be explained, *then* social planners would be justified in designing social policy on the assumption that, other things being equal, people will be good to each other. Thus, group selectionism is associated with a kind of liberal optimism, as opposed, say, to a Hobbesian conservative pessimism about what one must do to achieve order in society.

I am also sympathetic to these critics' enthusiasm for evolutionary psychology, and I share their view that the most widely-distributed features of human behavior—such as the capacity to form religions—must be compatible with principles that have guided the evolution of behavior in all creatures. I have no more patience for the concept of the “special evolution” of human behavior than I have for the concept of the “special creation” of human form. However, I depart from the critics in that I believe group selection has the power to produce group-level adaptations. The reason this issue is

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NICHOLAS S. THOMPSON

important is because I believe that it is absolutely necessary to any attempt to manage human aggression to determine whether group selection is a force in human behavioral evolution and, if it is, what characteristics of human nature it promotes. In fact, I hope to convince SKEPTIC readers that if they want to stay alive in the streets of Sarajevo (or New York) it behooves them to know something about what group selection is and what it can create.

The technical problem of group selection is this: imagine, for the moment, that there are two jewel thieves intent on a heist. In order to steal the jewels, one thief has to stand on the shoulders of the other to climb to the top of the fence, receive the jewels from the other, drop them on the safe side of the fence, and then reach down and pull his accomplice over the fence. When the two thieves are standing together on the wrong side of the fence with the jewels, it is obvious that they should cooperate. But as soon as one thief scales the top of the fence and receives

the jewels, there is no obvious reason why he should not simply drop to the ground on the safe side and walk off with the jewels, leaving his conspirator behind to take the heat for the theft. Granting that fact, there is no obvious reason for either thief to run the risk of getting stiffed by helping the other to climb the fence in the first place. Thus, the fact that the pair has a common interest in cooperating does not readily translate itself into cooperation by the individuals that make up the pair.

Vampire bats pose a similar problem. Vampire bats make their living by sucking—licking, actually—the blood of mammals in the dark of the night. These bats are rather sympathetic little creatures with a serious food storage problem—life is all feast or famine. If a bat finds food—a resting cow, for instance—it can easily harvest much more food than it can digest in a day. But because a bat must always be able to fly, it does not have the same options that we terrestrial carnivores have of eating itself fat in anticipation of lean times. A bat that returns to the roost without having found food on a given night is a Bat in Trouble. For this reason, unlucky bats solicit and are given food by other bats more fortunate than themselves.

Bat Welfare. A bat safety net. As in the case of the jewel thieves, we can easily see how this sharing is beneficial to bats in general. The rising tide of blood lifts all bats. What is harder to see is how natural selection could favor the generosity of the donor bat. How could a bat be selected for helping out one of its competitors in a pinch?

As Darwin was quick to point out, the very existence of such behavior is a challenge to natural selection. If you believe that evolution has occurred because those traits that conveyed reproductive advantages to the individuals that bore them were passed on in greater frequency to the next generation than those that did not, then you are hard pressed to explain the existence of traits that dictate self-sacrifice in their bearers, no matter who else may be the beneficiary of such traits. Phenomena similar to food-sharing in vampire bats challenged Darwinian evolutionists in the 1960s to think up a way for natural selection to generate apparently self-sacrificing behavior.

Why did it take so long for this crisis in evolutionary theory to emerge if Darwin knew about it a hundred years earlier? Any 19th-century bee keeper knew that the worker bees do not live long lives, nor do they have many grandchildren. So how do worker-bee traits get passed on to subsequent bee generations? The question is a good one and there is no simple answer (Seeley, 1995). Such facts might have been seen as fatal to Darwinism except for "naive group selection theory." Darwinians sometimes talked as if natural selection were choosing traits that benefited the species in competition with other species, rather than traits that benefited the heritable factors that made those traits possible in competition with alternative heritable factors. Because of such ways of speaking, the paradox of animal cooperation was disguised from the majority of people who regarded themselves as evolutionists. There was, until the 1960s, very little discussion of the fact that there was no way to translate benefits to the species into evolutionary change.

Once cooperation was recognized as a serious problem for Darwinism, a Darwinian solution was found for it: discriminating altruism. Granting that natural selection must ultimately be what explains animal social behavior, and granting that altruism was unlikely to be favored by natural selection if it was costly to altruists and if altruists handed out benefits indiscriminately to altruists and non-altruists alike, then altruism *must* be universally discriminating. That is, when we examine cases of cooperation closely, we will find that in every one, altruists manage to seek out other altruists to deliver their benefits. Three mechanisms were worked out for actualizing discriminating altruism: *kin selection*, *reciprocal altruism*, and *trait-group selection*.

In *kin selection*, cooperators seek out relatives for cooperation. This solves the paradox because relatives are disproportionately likely to bear altruist genes—sharing genes is, after all, what being a relative is about—and so the altruistic behavior supports the altruism. Even if the altruist gives up his life—as honey bee workers are so willing to do—the genetic material underlying that altruism is

carried on in the offspring of the queen bee, who is closely related to the worker. A kin selection explanation would seek to reconcile vampire bat generosity with natural selection theory by demonstrating that bats mostly help out relatives.

In *reciprocal altruism*, cooperators seek out for cooperation other individuals that are helpful. This solves the paradox because individuals that do altruistic things are disproportionately likely to bear altruist genes and so reciprocally altruistic behavior supports altruism. Even if the altruist gives up some opportunity or commodity of value, the genes for altruism are supported. A reciprocal altruism explanation of bat food-sharing would seek to reconcile bat generosity with natural selection theory by demonstrating that bats tend to share with bats that have previously shared with them. (For those readers interested in bats, per se, vampire bats do seem to share in this way and, consequently, reciprocal altruism does seem to be the explanation of bat cooperation. see Wilkinson, 1990.)

In *trait-group selection*, cooperators give out their benefits at random within the group, but these benefits fall discriminatively upon other altruists because those groups in which there are the most altruists receive the most benefit where there are more altruists to receive them. To see how this might work, imagine an extreme version of a vampire bat society where a bat cannot live more than 24 hours without food, so that a bat that cannot either find food on a given night or find another bat to provision him during the next day is a dead bat. Imagine, further, that the population of these bats is allocated to two caves of 100 bats each. Imagine that bats only find food on half the nights they search. Imagine that sharing and non-sharing are heritable traits and that in the first cave there are 20 altruistic sharing bats and 80 stingy bats, while in the second cave there are 80 altruistic sharing bats and 20 stingy ones. Finally, imagine that sharing food with another bat imposes some cost on the generous bat, such that one in 10 sharers does not himself make it through the following day.

What will happen? Somewhat different consequences will occur in the two caves. In the "stingier" cave, of the 50 bats that come home hungry, 10 will be altruistic and 40 will be stingy. The same proportions will exist in the bats that come back fed. In this cave, therefore there will be only 10 well-fed bats to provision 50 hungry bats, 40 stingy and ten altruists. Assuming they are provisioned at random, all but two of the unsuccessful altruistic bats will die and all but eight of the stingy ones. One of the 10 generous bats will die overnight because of his generosity. Thus, at sunset on the second day, the group in the stingier cave will consist of 59 bats, of which 48 (81%) are stingy and 11 (19%) are generous.

In the "more generous" cave, of the 50 bats that come home hungry, 40 will be altruistic and 10 will be stingy. The same proportions will exist in the bats that come back fed. In this cave, therefore, there will be 40 well-fed bats to provision 50 hungry ones, 10 stingy and 40 generous. Assuming they are provisioned at random, *eight* of the stingy unsuccessful bats will survive along with 32 of the

generous ones. Four of the 40 generous bats will die overnight because of their generosity. Thus, at sunset on the second day, the group in the more generous cave will consist of 86 bats, of which 18 (21%) are stingy and 68 (79%) are generous.

Notice that the proportion of stingy bats is increasing in both caves, from 80% to 81% in the stingier cave and from 20% to 21% in the more generous cave. On this evidence, this bat model seems to support critics's doubts about group selection. But not so fast! What about the proportion of stingy and generous bats over all? In fact, when you add up the contributions of both groups to the overall total, you find that the proportion of generous bats is on the increase in the overall population, from 50% to 54%.

Readers may feel, at this point that they are victims of a mathematical parlor trick. What if anything does this tell us about the real world? It tells us something surprising about the relationship between the changes in the constituency of a population and changes in the constituency of small groups that might make up that population: they can move in opposite directions. Even if we increase the proportion of one type of individual in every small group in a population, we still might be *decreasing* the proportion of that type in the overall population. In short, selection within groups does not necessarily predict selection overall.

Even granting that such a mathematical anomaly *could* occur in the parlor, could it occur in nature? The basis for the parlor trick is starting with two caves in which the proportion of generous bats differs markedly. How would such an allocation come about naturally? There are two obvious ways, but these are both forbidden by the terms of the argument I am making. Bats could end up in groups of different constituency because they hang around with relatives (and relatives tend to be the same) or bats could end up in groups of different constituency because they hang around with bats like themselves in their degree of altruism. The reason these arguments are forbidden here is that the first is kin selection and the second is reciprocal altruism, and I am attempting here to show that group selection is a form of explanation apart from these other two.

Once these two ways of producing disproportionate groups have been eliminated *ex hypothesi*, what remains? The answer is, random processes. If you have a large jar of, say, M & Ms, and you start taking out handfuls from the jar, each of your handfuls will have different proportions of the different colored candies, even though they are all drawn from the same jar. How big those differences in proportion are will depend on how large your hands are. People with small hands will grab handfuls with more variable proportions than people with large hands.

Are such random differences in group composition sufficient to produce group selection in nature? As is so often true in such matters, the devil is in the details. The details, in this case, are group sizes, the power of generosity to increase the productivity of groups, the cost to individuals of being generous, and, perhaps most significant, the variation in the composition of groups. The group selection bat

model above worked because I forced big differences in the proportions in the two groups and because generosity was moderately effective and not very costly to the generous. But with the relatively minor differences in group composition that random assortment is likely to produce, the effects of generosity would have to be greater (and its costs moderate) for natural selection to promote group selection. Under these conditions, natural selection between groups could promote a kind of cooperative behavior in which my cooperative behavior enhances my fitness some, but enhances the fitness of other group members more.

Are these conditions likely to have prevailed in the course of human evolution? Let's assume, for the purposes of argument, that in human pre-history, humans behaved as did the tribes of Israel in Hartung's account: i.e., they were gathered into small bands of pastoralists that competed fiercely for territory. When two groups encountered one another, one group killed the other, one group enslaved the other, or the two groups fought to a standstill. How could nature have selected for such a high level of aggressiveness among human groups?

If we are to come to a clear answer to this question, we must first see clearly what the problem of altruism is in this case. There is no doubt in any Darwinist's mind that an attack by a group of well-organized, single-minded fighters is more effective than an attack by a group of hopeful but ambivalent individuals. But how do you get all the individuals to participate in such an attack if functional organization requires some to take more risks than others. What, you might ask, is the fate of the gene for "Leading the Charge," if, as we suspect, fighters who lead the charge seem to get cut down in much greater numbers than fighters who bring up the rear. What divides Darwinists is the question of what kind of selection sustains such aggressive group behavior in the face of its tremendous cost to some individuals.

Kin selection? Possible. Leaders of the charge would have to be guaranteed that the individuals they led the charge *against* are sufficiently more distantly related than the individuals they lead the charge *for* to compensate for the high cost of leading the charge. Remember that this is warfare between groups, not lineages. Granted that members of groups were probably somewhat more closely related than out-group members, still, with out-group marriage likely a necessity to prevent incest, the contour of relatedness at group boundaries was probably not much steeper than the contour of relatedness between lineages within the group. Therefore, to help group members to kill off the members of other groups was probably not a particularly efficient way for lead-the-charge genes to help relatives distribute other lead-the-charge genes.

Reciprocal altruism? Also possible. But remember that reciprocal altruism works because the altruist selects for his cooperation individuals who have behaved altruistically in the past. If the altruistic behavior is heroism in battle, nature could as well select for altruism directed toward the heroes of the other side as for the

heroes of one's own side. Moreover, the more dangerous the contest, the more difficult it is for reciprocal altruism to work. A gene for fighting-to-the-death cannot obviously be supported by reciprocal altruism because once an individual has manifested it, he is beyond help. So, like kin selection, reciprocal altruism does not readily account for coordination in group aggression.

So, what then about group selection? For group selection to be the explanation for group assaults on other groups, groups (of unrelated individuals) with a higher proportion of charge-leaders would have to be so much more successful than such groups with a lower proportion of charge-leaders that their success would more than compensate in their production of charge-leaders for the greater vulnerability of charge-leaders in charges.

Given the high costs of losing a battle, the warfare of the time may have produced exactly these conditions. Assume for the purposes of demonstration that two of the cruelest tribes of ancient Israel encounter one another at the boundaries of their territories and prepare to do battle. Imagine that the battle is a winner-take-all contest in which the winners double their reproductive rate from 1 to 2 per combatant and the losers all die. Now, finally, imagine that the proportion of combatants of the type that are willing to lead charges determines the outcome of the battle and that one group has 40% individuals willing to lead charges and the other has 60% individuals willing to lead charges. Imagine that (because of the nature of charge leadership) only 10% of these potential charge-leaders ever get to lead a charge and of these half die in the effort. A year after the battle, the entire group that had the smaller number of charge-leaders is dead. Three of the six charge-leaders lost their lives in the battle, but the group with the greater number of charge-leaders has doubled in size. So, in the overall population, there are $2(60-3)=114$ charge-leaders and $2(40)=80$ non-charge-leaders. The proportion of charge-leaders in the overall population has increased from 50 percent to 59 percent. Moreover, if the winning group now encounters another group, it will be that much more likely to win on account of its increased proportion of charge-leaders.

Another parlor trick? Perhaps. But human beings do seem to be very quick to form adventitious groups, particularly for aggressive purposes. One of the most telling of social psychology experiments involves taking a large group of people, splitting them at random into small groups, marking the small groups in some superficial way and putting them in competition (Wilder, 1986). The markings may be as simple as giving one group red lapel pins and the other group green lapel pins. Under those circumstances, group members readily begin to identify other groups by these markers and to disparage members of other groups for possession of traits supposedly related to group membership. One such experiment, involving kids at a summer camp, had to be discontinued before it was completed because the kids were in danger of hurting each other (Sherif et al, 1961).

Where does this leave us? I hope I have shown that group selec-

tion explanations are plausible accounts for human cooperative behavior when the advantages of such behavior to groups are very great and when these advantages related to the number of cooperators within the group. These conditions are particularly likely to be met in situations in which one group is organized to exterminate another because the winners not only obtain material benefits, they also get rid of competitors. Thus, this sort of explanation should be particularly tempting in situations in which human beings form adventitious groups for aggressive purposes. I am thinking here particularly of terrorist groups, death squads, lynch mobs, posses, and street gangs. The street wisdom to be gained from this insight is that you have no reason to feel safe when encountering a hostile group just because you know that group is a "pickup" group with no enduring relations based on genetic relatedness or reciprocal assistance.

Notice that this group selection view leads to no dewy-eyed expectations about human goodness or the triumph of politically-correct values. On the contrary, the belief that group selection has played a significant role in human evolution leads to the expectation that racism and ecological calamity will prove to be particularly difficult problems. Eliminating racism will be difficult because the human tendency to form adventitious conspiratorial groups is fostered by the presence of such superficial but ineradicable human differences as skin color. Heading off ecological calamity will prove to be difficult because human beings of many groups will be slow to confront a common threat to all of them because response to such a threat does not guarantee an advantage of one group vis-a-vis another.

Thus, I think, a Hobbesian like Hartung and other group-selection critics should embrace group selectionism not only because it is mathematically plausible, but because embracing group selection as a possibility leads exactly to the sort of tough realism that will be required to deal with an evolving geopolitical situation in which every human group has its clenched fingers on the throat of every other. □

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