On Territoriality in Hunter-Gatherers

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Cashdan's intention of using an evolutionary framework to examine cross-cultural variations in territorial defense is admirable, but her argument about the applicability of available models, her own model, and the data used to support it (CA 24:47–66) are all severely flawed. Specifically, Cashdan makes three errors. First, she erroneously assumes that only humans (and only some human groups) limit access to social groups. Second, she erroneously equates access to social group membership with access to the resources that the social group believes it has rights over. Third, she treats subjective impressions and interpretations as if they were data accurately gathered to address the topic of concern. While some of the commentators challenge one or two of these three points, there seems to be considerable satisfaction with the paper as presented. Several of the commentators, however, seem to question the application of evolutionary theory or "animal models" to the study of human behavior, and I will begin by addressing this point.

That humans are unique is a truism. Anything that can be given a label is by definition unique in some way. In considering the behavior of an organism, the only relevant question concerning its uniqueness is, What is it about the peculiar characteristics of this organism that is likely to affect the behavior of interest? General hypotheses about the behavior of living organisms specify the variables which affect that behavior and how they affect it. These models are not developed to explain particular "birds, trees, or fish," for such models would be of little general interest. Instead, they predict what organisms with certain characteristics will do in certain contexts. They are then tested to see how well they predict the behavior of specific organisms (birds, trees, or fish). There is no a priori reason to assume that such a model will not work equally well for any other organism that does not differ significantly in the variables shown to be relevant to the behavior in question. A simple example illustrates this point. The law of gravity is a model designed to explain interactions between bodies that have mass. Because mass appears to be the only relevant variable involved, organisms that differ in other ways are still expected to behave similarly with respect to this model. Whether the model is first tested on rocks or human beings makes no difference; it can eventually be shown to be equally applicable to both.

According to the models of territorial defense that Cashdan reviews, living organisms will defend resources when the potential benefits are greater than the potential costs (the currency is inclusive fitness). Since being a living organism is the only relevant criterion, the models, if they are correct, should apply to humans as well as all other living organisms. Instead of assuming that humans are unique in ways that negate such models, as many of the commentators do, we should be asking whether the characteristics that set *Homo sapiens* apart are likely to invalidate them. The cost-benefit models reviewed are quite flexible in dealing with characters specific to certain organisms that alter the costs of resource defense. For example, because birds can fly, they incur lower energy costs in defending certain-sized territories than do rodents. Similarly, humans, because of their intellectual and communicative abilities, may show associated differences in the costs of territorial defense. Investigation of the uniquely human costs of territorial defense is implied by any ecologically oriented study of human territoriality. The presence of learning, memory, and complex communication systems does not rule out explanations of behavior based upon adaptation through natural selection. While these features may alter the costs and benefits of territorial defense, the central questions are (1) Do the behaviors of organisms, including humans, that possess these features still operate to maximize inclusive fitness? and (2) Are variables such as resource density and predictability the important determinants of fitness costs and benefits of territorial defense regardless of the presence of these features? The a priori belief (implied or stated by many commentators) that humans are so special as to require entirely separate models (or none at all) is primarily a leap of faith.

Given the above theoretical base (the one I assume Cashdan began with), it is somewhat bewildering that she creates the dichotomy between perimeter defense and social boundary defense. She seems to be implying that humans alone (and only some human groups) limit access to social groups and, furthermore, that only some human groups (and no nonhuman social groups) "make acceptance into the local land-using group a preliminary requirement for using resources in its territory." A more accurate statement would be "they *attempt* to make acceptance into the local group a prerequisite for using resources in its territory," and this statement describes probably all human groups and also many other social organisms (excellent descriptions for social carnivores are found in MacDonald 1983). According to the cost-benefit ecological models of territoriality, the problem facing many social organisms is how well the social group can control access to nearby resources and whether it is worth the effort.

Cashdan does not use the evolutionary perspective that has perhaps produced the greatest insights into behavior in the past two decades. Specifically, she does not address the question how those who do not obey the membership rules are to be stopped from exploiting the resources that the social group believes to be its own. Quite simply, social boundary defense is equivalent to perimeter defense only in a world of cooperators who accept rules that may work to their own disadvantage. A social group's "rights" to certain areas depend on its ability to defend those areas. People in our society practice perimeter defense by putting locks on doors and maintaining a police force even though access to household goods is supposedly defined by membership in the family. From this perspective, it is difficult to see how the cost of territorial defense could ever be independent of the size of the territory. Securing a large estate is more costly than securing a small house despite all the cultural complexity of modern society.

Cashdan gives lip service to the problem of noncooperators, but her conclusions are far from convincing. Her argument about the advantage to be gained by asking members of a social group about resources in their territory assumes considerable ignorance on the part of the potential trespasser. It is unlikely that members of a social group would know "their territory" much better than members of a neighboring group that frequently trespassed to exploit the resources in that territory. What benefits accrue to the group providing the information, and are these benefits outweighed by the costs of competition? If one is denied permission, detection of trespassing is immediate. Is the risk of being denied permission worth the alleged increase in information about resources? Cashdan too quickly dismisses the problem of the costs and benefits of asking for or granting permission. It is also difficult to follow her logic that trespassers are more likely to be detected in a large territory than in a smaller one.

The factors affecting access to social groups are a very different and probably more complex problem that is only now being addressed by behavioral ecologists (e.g., Rood 1979, Fricke 1979, Reyer 1980, MacDonald 1983). Certainly the decision whether to let an individual join the social group involves more than permission to forage in a certain area. The individual's likely contribution to existing members' subsistence, his probable competition for mates, whom he brings along, and his potential as an ally in warfare are just a few of the factors that may be important. On the other hand, the organism facing the dilemma of whether or not to defend certain resources, knowing

that he cannot expect competitors to bypass valuable resources if he does not grant permission, has a much simpler decision to make. Are the resources worth the effort that it would take to defend them?

The cost-benefit models reviewed by Cashdan seem quite promising, but the extent to which they accurately predict territorial behavior in animals has not been fully determined. Whether or not predictions from those models are met for humans must be determined empirically. Unfortunately, the data base upon which Cashdan relies is a mirage. Subjective impressions and interpretations of territoriality can probably support or refute almost any model imaginable. Informant opinions are likely to be so biased as to be of limited use. It is ironic and instructive that the group I have worked with for five years, the Ache (Guayaki) of eastern Paraguay, is considered by Cashdan to show only perimeter defense and to be very territorial. She places the !Kung at the opposite extreme. Yet, I can discern little difference between the Ache and the !Kung with respect to acceptance into the social group or perimeter defense. I would, however, be the first to admit that the relevant data for determining differences or similarities between the groups exist for neither.

The data necessary to test the models of territoriality presented by evolutionary biologists have never been collected for a single human group, let alone several. If Cashdan's own fieldwork has produced such data, I would strongly suggest that she publish them before rejecting the models being examined. The data required to test these models would include quantitative measurements (or very good estimates) of the costs of defending a given area and the potential benefits to be derived. They would also include determinations by behavioral sampling of the extent to which an area is being monitored for competitors, how often it is violated, and what is done when an intruder is discovered. The methods used to obtain the data would need to be explicit and capable of application by any objective observer. When we have such data for several groups we will be in a position to ask whether the defense of resources is determined by the ratio of the cost of that defense to resulting benefits. Other models may indeed more accurately predict territorial behavior. However, no model shown to predict the behavior of many living organisms in well-designed tests should be rejected for humans on the basis of subjective impressions taken for data. A poor test of a theory is no test at all.