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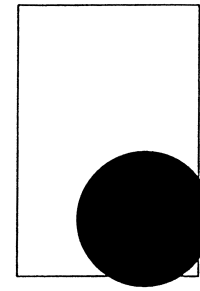

Materialist, cultural and biological theories on why Yanomami make war

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Abstract

For decades, there have been three primary anthropological perspectives on why people make war: materialist, cultural, and biological. Each has a long history of application to the Yanomami. This paper considers these three alternatives. First, it summarizes the author's materialist models and what they are purported to explain. Second, it discusses more cultural explanations offered by several field researchers, concluding that some might be synthesized with a materialist perspective, while others seem irreconcilable. Finally, a range of hypotheses invoking evolved predispositions are considered and found to be directly contradicted by Yanomami ethnography, even if limited to the works of Napoleon Chagnon.

Key Words

biology • culture • materialism • theory • warfare • Yanomami

War should be thoroughly interrogated. Many questions call for answers. But the question of questions is that posed in an exchange between Einstein and Freud, 'Why war?' (Freud, 1964). What makes people, on occasion, willing to kill others defined as enemies? The anthropology of war has offered many answers to that question, involving a huge range of explanatory variables. But over the past 30 years or so, three broad alternatives have emerged in the field: materialist, cultural, and biological (Haas, 1990).

Materialist explanations see war as following self interest, an effort to maintain or improve material conditions, as argued in varieties of ecological theory and conflict-oriented approaches to sociocultural evolution. That is where my own approaches to war began, but what I will describe here is an admittedly idiosyncratic turn of that perspective. Cultural approaches hold that war is the acting out of values and beliefs characteristic of a particular group, with explications ranging from simple listings of elicited goals to dense hermeneutic deconstructions. Biological perspectives assert that war is chosen

because in our species' evolutionary history a penchant for collective violence enhanced the likelihood of passing along genes, directly, beyond any considerations of material well-being and regardless of cultural values. Persistence of such divergent answers for so long might lead to despair about prospects for theoretical advance, for providing some firm answers to the big question. But it is not that theoretical alternatives *cannot* be compared and evaluated as explanations, just that they usually *are not*. Much more commonly, a scholar presents one theory and dismisses or ignores the alternatives. The different theoretical currents then continue in their own, self-enclosed way.

The case of Yanomami[1] warfare offers an opportunity to do better. A people and pattern familiar to all anthropologists, it is difficult to conduct any general discussion of war without considering the Yanomami. Detailed, abundant, ethnographic and historical documentation is available. Yanomami warfare was the crucible in which the most controversial ecological hypothesis on war was developed and tested: the 'protein hypothesis'. That theory is evaluated in previous publications (Ferguson, 1989a, 1989b, 1995a: 349–53), in which I conclude that several of the relationships it posits are correct, but that it does not explain war. Research on the protein hypothesis led me to develop alternative materialist approaches to Yanomami warfare. But that war pattern has likewise been the focus of cultural and biological theories. It is this convergence of alternatives that led to this paper.

TWO MATERIALIST APPROACHES

I have employed two distinctive, overlapping and complementary approaches toward understanding Yanomami warfare. One was developed in a prior investigation of warfare on the Pacific Northwest Coast (Ferguson, 1984a). Its most general hypothesis (Ferguson, 1984b: 37–42, 1990: 29) is that wars occur when those who decide military policy believe it will serve their material interests. My argument is that the actual patterning of fighting – periods of intense war or relative calm, who attacks, who is attacked, and when – is understandable as efforts to protect or improve material circumstances in historically changing conditions. Informants did not state that they were motivated to war for these reasons, but this was inferred from the actual pattern of who attacked whom, and when, using *all* reported cases of war. This I call an etic behavioral approach to war.

Yanomami Warfare: A Political History (Ferguson, 1995a, hereafter *YW*, and see Jones, 1998; Steel, 1998) applies this approach to the Yanomami. It compiles *every* reported case of Yanomami warfare from Venezuela and Brazil, maps them against a reconstruction of Western impingement on their lands, and establishes a clear temporal and spatial connection: wars break out at moments of major change in the Western presence. Competitive interests in regard to possession and control of Western manufactured goods, most notably steel tools, explains this connection, as they do other major aspects of political history, including village fissioning, population movements, alliances, factionalism, and non-lethal combats. This introduced technology, circulated in advance of direct Western contact, revolutionized Yanomami subsistence. Cutting tools rapidly became critical means of production, and transformed intervillage structure in a way that generated extreme hostilities, as well as close alliances.

The likelihood of war erupting in a given area is determined by the spatial distribution and amount of Western goods available, plus factors affecting military strength, particularly shotguns. No war is predicted when there is a general scarcity and no new source

of incoming Western goods, or when Western goods are abundant and coming in through so many sources that they cannot be monopolized. When Western goods are unequally distributed and the possessors do not have substantial military advantages, they will be raided. When goods are unequally distributed and the possessors have such advantages, they will use force in various ways to deter competitors. When goods are unequally distributed but the possessors have so much that they can trade out large quantities, which usually means they will also have shotguns, they will establish peaceful relations with their neighbors. Often, these newly dependent neighbors will then raid another group further out – potentially dangerous competitors – sometimes with the support of the local group at the Western source. War is most likely as a result of a major *change* in the sources of Western goods – a new intrusion, a relocation, or a withdrawal. Contrary to popular images, Yanomami wars are not interminable, and active fighting rarely lasts more than two years. By that time, by movement or alliance, some new accommodation will be made. Changes in Western sources destabilize existing relationships, and new ones are often forged through force, especially where the violence threshold has been lowered.

The political character of Yanomami alliances may be cordial or extremely tense. The latter often tip over into war. These are the cases when an insult or a fight over a woman are followed by bloodshed. Three sets of factors determine the tone of an alliance. One is the flow and ease of trading out Western goods. If trade controllers themselves have a rich source of new goods, they quickly pass them on, and may even allow good friends direct access to the golden geese. Inequalities in possessions are lessened, extraction of middleman benefits from allies is tempered by easy terms. They are 'generous', not 'stingy'. Second is the ability to apply force, which itself has four major dimensions: possession of shotguns, active support of a resident Westerner (both of which favor outpost villages), number of fighters from a village and allies, and relative ferocity of individual warriors (both of which tend to favor those away from the outposts). A combination of these four determines the relative military strength of potential opponents, and that determines whether one will risk a war, or short of that, how much coercive pressure will be brought to bear within an ongoing alliance. The third set of factors is the congruence or opposition of trade interests in a particular situation. If group B gets its machetes from village A, and passes them along to C, B will support A if group X tries to muscle it out of its location, but oppose any effort to establish a direct channel between A and C.

These considerations, and others to be discussed shortly, explain why war is very likely or very unlikely in a particular area and time, and which local groups are likely to be good friends, mortal enemies, or something in between. But those factors do not explain why one particular group decides between roughly balanced options to fight or to flee, or why of two potential allies or enemies, one is selected. Usually, not always, there are choices to be made. Decisions regarding war among Yanomami are commonly the result of long periods of public discussion and argument, in which speakers try to create a consensus by molding perceptions and invoking values. Listeners are persuaded, or not, and that affects what is done next. Sometimes decisions have to be made in an instant, without reflection, and there normative expectations will play an important role. Occasionally a single individual will take a precipitate act, which sets off bloody consequence for the group. In these ways, commonly held values and individual personalities

are critical for understanding the process leading to war. Within the deterministic structure of the model, this is clearly defined space for agency, even free will.

That is the theory. Most of *YW* is presentation of relevant evidence. It is impossible to summarize nearly three hundred pages of detailed historical reconstructions and analysis. By the end of part II, which covers the three (or so) Yanomam*i* peoples who speak other than Yanomam*o* (the focus of Chagnon's research), I believe it establishes as *fact* that wars typically occur in times and places of a major change in the Western presence, and are rare without that. It is the rich ethnography of the Yanomamo, especially in the Orinoco-Mavaca area, where detail gets down to personalities and even conversations, that I believe confirms the *explanation* of that coincidence, as described here. But that, of course, is for others to judge.

My second approach (Ferguson, 2000a) to Yanomami warfare is focused specifically on Yanomamo speakers around the confluence of the Orinoco and Mavaca rivers, those labeled 'fierce' by Chagnon (1968a). This employs a modified version of Harris's (1979) principle of infrastructural determinism. Simplified, infrastructure includes a people's demographic characteristics, their ecological relations, their technology, and their basic patterns of labor. Structure encompasses social organization, economics, and politics. Superstructure includes patterns of psychology, value and belief systems, and local knowledge. I have proposed (1995b) a programatic modification of Harris's principle that avoids reductionism by giving more autonomy to structure and superstructure and replaces its functionalist, adaptationist orientation with a focus on history and agency. Rather than seeking to explain everything with direct reference to infrastructure, the tripartite scheme is reconceptualized as a nested hierarchy of progressively more limiting constraints.

Abstractly, the analyst begins by identifying a set of infrastructural variables, and the state of those variables that are posited as having an affect – via their influence on materially self-interested actors – on behavior related to the phenomena to be explained, in this case variations in the practice of war. Taken together, the states of these variables provide an underlying specification of the kind of social relationships that will exist, delimiting or constraining them within certain ranges. The pattern of actual social interactions, which comprise 'structure', are based on general infrastructural conditions – the availability of resources, the potentials of technology, the sedentism and scale of populations, etc. – and by the specifically war-related constraints just noted. Structural alternatives of social, economic, political, and military relations are limited to a relatively narrow range of possibilities by these conditions of material existence. Yet structural domains have their own internal dynamics and interactions, not reducible to infrastructural conditioning. The operation of directly constrained and relatively autonomous variables and processes produces a set of real-world possibilities for military and related actions. Similarly, the realm of ideas and dispositions that is superstructure operates within the existing realities of general and war-specific patterns of infrastructure and structure, but also has its own autonomy and integrity, and it is by following processes at this level that the analyst gets closest to actual decisions to start killing.

In applying this approach to the Orinoco-Mavaca Yanomamo, the point is to explore a three-way relationship between war, local culture, and Western contact. This fleshes out and informs the more focused issues of the model of Yanomami war *occurrence*, allowing greater articulation with other theoretical approaches. It highlights a very

important threshold effect: as conditions deteriorated in the Orinoco-Mavaca area, it took much less to start raiding than at other times and places. And it enables us to understand better other violence besides war – all the pounding matches, wife-beatings, and other mayhem that made these people appear to be fierce.

Starting with infrastructure, in addition to the introduction of Western goods and steel tools already discussed, other factors were having a profound impact in the Orinoco-Mavaca area at the same time, directly affecting the kind of social relationships that would exist. Introduced epidemic diseases claimed many lives, shattering family arrangements built over many years. These had to be reconstituted immediately for life to continue. Game depletion did occur, and although it does not explain war, it did lead to a breakdown of the reciprocal sharing of meat that previously held communities together. Those who monopolized Westerners could not trek or relocate villages because that would end their control, so the basic method of defusing conflict by walking away from it was negated. All of this led to an extremely anomic situation in which violence between individual men and women within a village became commonplace, in stark contrast to other Yanomami communities not so disrupted (for all this, Ferguson, 2000a).

But the most important infrastructural condition for understanding war was the need for, and unequal availability of, steel tools. As contact proceeded, this determined that, structurally, a great inequality developed between local groups with good access to Western suppliers and those who relied on chains of middlemen traders. New radial patterns of exchange developed centering on those Yanomami attached to a mission or other Western outpost, with major consequences for the character of intervillage ties. Those who could distribute Western goods gave up making their own labor-intensive products (arrowheads, curare, hammocks, etc.), and obtained them instead from others. Those seeking good trade connections to well-placed middlemen ceded women for marriage, so there was a flow of women to villages around Western outposts, and a cline of sex ratio imbalance, with a surplus of women at the center and a scarcity at the ends of trade channels. Bride service became similarly unbalanced. Those with a good outside connection paid it off with Western goods, while men who married into middleman groups endured protracted and especially onerous servitude. Political alliances arose upon this foundation of trade and intermarriage, and so did war. Raiding, in various forms, was directed at establishing, protecting, or breaking middleman control over access to Westerners, including resident anthropologists.

These structural changes determined changes in superstructure. Existing Yanomami values were harnessed to make meaning and motivation appropriate to prevailing structural conditions. Heightened male aggressiveness became a requirement when so many employed violence. Accusations of cowardice were used in harangues of reluctant warriors. The idioms of insult, revenge, and sorcery were brought into any situation of conflict, to focus negative opinion on the enemy, assigning blame for bloodshed on them and making a raid into a moral duty. All of these are deeply meaningful for the Yanomamo, and unquestionably motivate action, but they usually are not made an issue until two local groups already are on hostile terms. Even mythology changed. Orinoco-Mavaca Yanomamo tell of the blood of a wounded moon falling to earth and making men fierce, a story absent in other regions.

Beside the general tone of interpersonal violence, there was especially marked aggression of men against women, not found among other Yanomami. Infrastructurally, the

sedentism of villages around Western outposts changed female labor, drastically reducing the wide-spectrum gathering of women in mobile groups, and turning them into haulers of water and firewood. Structurally, the high level of local warfare favored development of virilocal fraternal interest groups, and the very unusual number of women married into middleman villages lacked the customary protection of resident male kin. Finally, war itself fostered domineering men and relatively accepting women – although the latter point has been overdone in some descriptions – because it was the men who protected women from other men. All these contact-related changes diminished the status of women, and in the climate of violence, encouraged brutality against them.

This concludes presentation of my two approaches to Yanomami warfare. The following two sections use this theory and Yanomami ethnography to consider key points in two different anthropological perspectives on war.

CULTURAL APPROACHES

The most common anthropological explanation of war is that it is an expression of a particular culture, with 'culture' here meant in the restricted sense of symbolic belief systems. Countless older ethnographies attribute war matter-of-factly to a list of elicited cultural rationales – as quests for revenge, prestige, trophies, supernatural power, etc. Values, religious conceptions, or world views that encourage war sometimes have been taken as a given, sometimes explained by or related to other institutions or conditions. Currently, hermeneutic or interpretive approaches to non-state warfare stress that goals, conduct, and meaning should be seen within the logics of broader cultural understandings.

Cultural approaches have many direct applications to Yanomami warfare, and indeed this general perspective represents the most serious challenge to the models I have argued. Four anthropologists – Bruce Albert, Napoleon Chagnon, Kenneth Good, and Jacques Lizot – and John Peters (a missionary turned sociologist), each with extensive field experience, have considered my explanation in relation to Yanomami culture, and found it wanting. To some degree, objections may reflect a reluctance to accept the idea that the presence of outside observers itself may contribute to political violence, but there are clearly substantive theoretical issues involved.

The most detailed challenge comes from Peters (1998: 207–20). Peters finds the idea that Yanomami raided to obtain steel tools is valid for the time up to the founding of his mission, but not applicable thereafter. (An adequate response to Peters would require far too much space for this paper, but the reader is referred to my previous analysis of those events [Ferguson, 1995a: 139–46].) The attacks that occurred after the mission founding he attributes to suspicions of sorcery, an emphasis on revenge for physical and supernatural injury, a valorization of male aggressiveness and confrontation, and, with all of that, an atmosphere of rumor, deception, and distrust that makes political relations teeter perpetually on the brink of war. This is not dissimilar to factors stressed by Chagnon in many writings (e.g. 1988), although Peters discounts the motive of capturing women, and leaves out the sociobiology. Lizot and Albert also emphasize the importance of ideas about sorcery and revenge, with particular slants to be discussed shortly. Finally, Good (Good with Chanoff, 1991; Good, 1999) asserts that a variety of such motivations contribute to Yanomami warfare, which he stresses cannot be reduced to any one goal; just as Chagnon (1996: 218–19) has stressed that it is an accumulation of personal, individual motivations, rather than one group policy, that add up to a decision to raid.

I entirely agree that many culturally constituted perceptions and motivations go into any raid (see Ferguson, 1984b: 41), but see these usually operating in a systemic way, in concert with underlying material interests, in this case structured by the distribution of Western goods (see Ferguson, 1995a: 364–5, 2000: 222–4). Individual grievances and wants arise in the course of daily life. The question is why do these *only sometimes* intensify to the point of war, between two or more collectivities of individuals. Witchcraft suspicions, we have long known (see Marwick, 1970) typically are not random, but reflect existing bad feelings. Among Yanomami, reasons for taking revenge exist, latently, in virtually every direction, but are acted on only sometimes. Even seriously bad behavior may be tolerated from generous benefactors or loyal allies, but minor affronts can lead to violence against stingy exploiters or demanding outsiders. Fights can erupt over a great variety of matters because in a strained relationship even a trivial slight can stand for the whole, and it is the whole relationship that is at issue. In attempting to justify the profoundly anti-social behavior of war to oneself or to others, material interests will invariably be couched in terms of the highest applicable moral principles. Accusations of sorcery make 'them' the aggressors; invocations of revenge make 'us' righteous. Appeals to bravery or denigrations of cowardice are levers to bring others along. Thus the etic reasons for a war cannot be assessed by emic elicitation, but by examining behavior – who attacks whom, and when.

Sometimes sentiments of revenge *do* transcend any consideration of material gain, as when a highly unusual slaughter of perhaps a dozen men gave an inordinate number of individuals a common focus of vengeance (Ferguson, 1995a: 354). Sometimes panicky suspicions of witchcraft *do* overwhelm more calculated animosities, as when large numbers are felled by new and terrifying fevers (Ferguson, 2000a: 224). But these are exceptional situations. On the other hand, it indeed is very common that rumor and mistrust create a dense 'fog of war' in which individual acts can lead to one or another pattern of alliance or raiding. This, especially, is where I see a role for 'agency' specific individuals making choices that determine the actual course of events – but in a context and with options that are structured by the nested hierarchy of constraints discussed in the first section (Ferguson, 1995a: 226–9, 335–6).

Lizot (1994: 229–32, 238 n. 25), following Lévi-Strauss (1943), gives a cultural interpretation a structuralist, and more assertive, twist. War does not really need a separate explanation, he asserts, because taking revenge is, like trade, merely one of several forms of exchange, governed by the ruling principle of reciprocity. War and peaceful intercourse are 'both the same expression of the social structure . . . nothing more than two modalities' (Lizot, 1994: 232). This is how the Yanomami think about it, he insists, while castigating my analysis for being 'entirely foreign' to them (Lizot, 1994: 238). But there is abundant documentation, in my and many other works, that Yanomami *do not* think of a condition of ongoing deadly violence as 'the same' as times without it, and make great efforts to avoid such states. Even if one thinks of war and peace as merely alternate modalities, one is still left with the question of why a switch from one to another occurs, which Lizot cannot explain.

Probably the most sophisticated cultural approach to Yanomami warfare, one consistent with current hermeneutic trends, has been suggested by Albert (1989, 1990), who has also made extensive study of eastern and southern Yanomami history and of their changing conceptualization of contact (Albert, 1985, 1988). Albert is open to the salience

of Western goods as leading to the intensification of raiding (in Rabben, 1998: 138 n. 10), but his own analysis goes elsewhere. He argues (Albert, 1990: 561–2) that Yanomami conceptualize, and so act out, war through complex cultural constructions involving classifications of social and moral distance, ideas about physical and supernatural aggression, and a pattern of symbolic and ritual exchanges. These are 'essential constitutive dimensions of warfare as a social institution' and any analysis that leaves them out is incomplete, impoverished. Lizot (1994: 228 n. 25) makes a more pointed but similar criticism of my work as being divorced from the Yanomami's way of thinking.

I accept this criticism. If such dimensions were given more attention, my work would be more complete, at a finer level of explanatory resolution, and certainly more attuned to the meanings Yanomami themselves attach to events. However, for understanding Yanomami warfare in a *comparative* perspective, such local knowledge is not essential. Notwithstanding the highly particular conceptualizations through which Yanomami have dealt with the entire situation of contact, their political responses are very much within regular parameters for indigenous people the world over. In my view, moral systems are 'brought along' by changing material interests, providing the means for thinking about essentials for physical survival in terms attuned to existing culture. My expectation is that, with perfect data, we would see Yanomami understandings shift over time and tailored to particular cases, following shifts in the sources and costs of Western goods and military balances. But it is the *cultural system* that imbues the cold tendrils of need with bubbling hot meaning. A theoretical issue for the future is a better understanding of how the practical and symbolic articulate and shape each other. Whereas Albert argues that our task should be to 'unravel the specific cultural constructs [involved in warfare] before analyzing the non-cultural factors that may be involved in actual wars' (1990: 562), I think more progress will come by starting at both ends and working toward the middle.

BIOLOGICAL APPROACHES

A variety of overlapping approaches attempt to explain war as a result of biological attributes acquired through natural selection during human evolution, including sociobiology, evolutionary psychology, and applications from evolutionary ecology, primatology, and ethology. The general proposition uniting all these is that people actively seek to promote the reproductive success of themselves and their genetic relatives – directly, above and beyond their concern with material well-being – and have an evolved capacity to act violently and in groups toward that end. The Yanomami provide an acid test for such approaches to war because Chagnon is one of the leading theorists in that area, and his long-term, amply funded research has produced enormous amounts of data. Thus it is ironic that, on point after point, the Yanomami case provides decisive refutation of these positions. To establish this point more firmly, the following refutations will rely almost entirely on the writings of Chagnon himself.

Contrary to popular understandings, and the assertions of leading evolutionary psychologists Leda Cosmides (quoted in Gibbons, 1993: 987) and David Buss (1994: 219), the Yanomami do not go to war to capture women – which Cosmides claims to be the best reason to fight from a reproductive perspective and the evolutionary basis for the origins of war. Chagnon (1968a: 123) states in the first (and every) edition of *Yanomamo* that 'few raids are initiated solely with the intention of capturing women'. Recently, he

wrote (1996: 222) to correct misinterpretations of Yanomamo warfare that are 'definitely not true', stating: 'Their "wars" are not initiated or intended to capture females from enemies', although women may be captured on a raid if the opportunity presents itself.

Instead, Chagnon's argument has been that wars begin in conflicts between men over women, and then are continued out of revenge (Chagnon, 1988: 986). Yet pressed to clarify this position by other anthropological investigators of war at a School of American Research Advanced Seminar (see Haas, 1990; McCauley, 1990), Chagnon retreated to a much less assertive position. In the paper that came out of that seminar (Chagnon, 1990a: 82; also see 1996: 219), he merely claims that in the complex interpersonal histories that precede any war, it is common to find some that involve sex or marriage ('conflicts of reproductive interests'). Such conflicts certainly exist. *YW* compiles more examples of them than any previous source. But they are entirely non-predictive regarding war. In fact the two situations that Chagnon himself (1990a: 96–7, 104) chose to illustrate his argument involve a conflict over women that did *not* lead to a war, and a war that did occur but did *not* involve any preceding conflict of that nature. When conflicts over women are situated in context, the relative intensity and structure of those conflicts, and whether or not they lead to war, are largely determined by factors associated with Western contact (see Ferguson, 1988: 148–52, 1995a: 355–8, 2000a: 220–1).

Chagnon (1979: 128, 1987: 29) has argued that people consciously or unconsciously track their environment to make decisions that maximize their reproductive success and inclusive fitness. The position is clouded by seemingly contradictory formulations that reproductive and somatic objectives are (a) alternatives or (b) ultimate and proximate goals (1988: 985, 1989: 567–8, 1990a: 79, 81). Either way, the bottom line is the same: if Chagnon is right, active participation in war should pay off with more offspring – and this is exactly what he claims to prove in a very widely cited article in the journal *Science* (1988). Here he provides statistics showing that *unokais* – men who have undergone a ritual purification required after participating in a killing – have more wives and children than non-*unokais*. Albert (1989: 638, 1990: 559–60) and Lizot (1989: 33) immediately challenged the meaning Chagnon gave to *unokai* as a valid marker of actually having killed another person. Chagnon (1990b: 49–50) replied that the way he collected data, it is. My own criticism has been of the statistics themselves (Ferguson, 1989c, 1995a: 358–62), reproduced here.

Reproductive Success of *Unokais* and Non-*Unokais* as of 1987

	Unokais			**Non-*unokais***		
Ages	***n***	**Number of offspring**	**Average number of offspring**	***n***	**Number of offspring**	**Average number of offspring**
20–24	5	5	1.00	78	14	0.18
25–30	14	22	1.57	58	50	0.86
31–40	43	122	2.83	61	123	2.02
>41	75	524	6.99	46	193	4.19
Total	137	673	4.91	243	380	1.59

Source: Chagnon, 1988: 989

In discussing these statistics in a later publication, Chagnon (1990a: 95) claims that *unokais* have over three times as many children as non-*unokais of the same age* (e.g. *unokais* 'compared to same-age non-*unokai*, have over twice as many wives and over three times as many children' [also see Chagnon, 1992a: 205, 1992b: 39–40, 1997: 205]). This 'three times as many' figure is repeated again and again by other psychological Darwinists (e.g. Ghiglieri, 1999: 144; Low, 2000: 226; Pinker, 1997: 510; Wrangham and Peterson, 1996: 68). But as the table shows, the three-fold difference is for *all* men, regardless of age, and is due *primarily* to the fact that the vast majority of the youngest men have no children and are not *unokai*. (If Chagnon had included males from 15 to 19 years old, *unokais* might approach having five times as many children.) About 70 per cent of that imagined advantage evaporates when the comparison is within the same age category. Even the advantage that remains is exaggerated, since within each age category, the same relationship with age will exist: a 31-year-old man will be less likely to be *unokai*, and less likely to have as many children, as a 40-year-old man. Indeed, Chagnon (1990b: 50 n. 1) acknowledges that the five men listed as *unokais* in the 20–24-year-old category, 'may, in fact, be 25 years old or older'.

Even without these corrections for age, the significance of having participated in a killing for reproductive success dissipates further, because all the headmen are in the *unokai* column (Chagnon, 1988: 988), and it is an axiom of Amazonian ethnography that headmen tend to have more wives than other men (Clastres, 1989: 32). Responding to this point, Chagnon (1989: 566) reanalyzed the data taking the headmen out. This reduced the association between *unokai* status and greater reproductive success to a statistical relationship at the 0.05 level of significance.

But even a statistical reproductive advantage for *unokai*s is extremely doubtful, given the fact that these figures, for reasons never explained, include *only those children whose fathers were still living* at the time of enumeration. Chagnon himself has stated (1988: 985) that Yanomamo seeking revenge 'always hope to dispatch the original killer'. My reconstructions show that six out of eight known individual war leaders were themselves killed in war, with the other two coming under protection of Westerners (Ferguson, 1995a: 361). Fierce men often die young. Keeping in mind that Chagnon's data, with headmen factored out, show *at most* a statistical advantage for living *unokais*, it seems very possible that eliminating those killed in war from the sample has reversed the actual 'reproductive advantage' here, and that non-*unokias* enjoy greater *lifetime* reproductive success than *unokais*. In response to this criticism (Ferguson, 1989c), Chagnon (1989: 566) announced that he then had the necessary data to settle the issue, and would publish it when it was analyzed. That was 11 years ago, and it has not appeared yet. Until, and unless, it does, there is no empirical foundation for the claim that among the Yanomami, taking the risks of participating in war leads to greater lifetime reproductive success.

Besides Chagnon's own theory, many other evolutionary biology explanations of war are falsified by Yanomami material. Consider first the pre-eminent evolutionary psychology theorists on homicide, Margo Wilson and Martin Daly, who refer to Chagnon's work frequently. They argue (Wilson and Daly, 1985; Daly and Wilson, 1988: 168–71) that competition for reproductive success is greatest among young males, and that this has led to an evolved predisposition to use violence. Their primary data set is homicide rates in Detroit and Canada, where the peak of homicide offenders is between the ages of 20 and 29. Of course, they do not claim that homicide confers reproductive success

today, but rather that this is an expression of a 'young male syndrome' that exists because that was the case in the evolutionary history of human violence, a point echoed by Wright (1994: 262). Maschner and Maschner (1998: 22–3) follow Daly and Wilson, and repeatedly cite Chagnon (1988), to claim that all war is driven by reproductively-oriented status striving by 'males between the ages of approximately 15 and 25–30'. Chagnon's statistics contradict this idea. A maximum of 6 per cent, and as noted earlier *possibly none*, of the men in his sample of between 20 and 24 years old had participated in a homicide, and only 12 per cent of the combined categories for 20–30 years old had done so, whereas 62 per cent of the men over 40 were *unokai*. Chagnon also tells us (1968a: 115, 129–30) that young men are likely to avoid physical confrontations, desert raiding parties, and be reluctant to attack at the last minute. On a raid, young men are kept from the most danger by older men, and are allowed to retreat first. Among the Yanomami, the chosen exemplar of our evolutionary past, killers are (by local standards) middle-aged married men.

Daly and Wilson also advance a hypothesis on a suspected corollary of war among the Yanomami: infanticide. As is well known, female infanticide was argued to be a consequence of war, which aggravated adult female scarcity (Chagnon, 1968a: 74–5, 1972: 273; Divale and Harris, 1976). (In previous discussions, I conclude that there is some evidence of an association, but the nature of the link and its consequences are unclear [1989b: 253–5, 1995a: 352].) But Daly and Wilson (1988: 47, 85) offer an entirely different perspective consistent with their interest in violence inflicted by step-parents on their genetically unrelated dependants: that Yanomami men who acquire wives who already have children demand that they be put to death (a claim repeated in Pinker, 1997: 433). There is no suggestion of this practice in six separate discussions of infanticide by Chagnon (1966: 53–7, 1968a: 74–5, 1968b: 139–40, 1972: 273, 1973: 134; Chagnon et al., 1979: 300–5). More recently, along the same lines, Sarah Hrdy (1999: 237–42) compares Yanomami (and by extension, humanity) to infanticidal monkeys by citing Helena Valero's account of a slaughter of children by raiders (Biocca, 1971: 34–7). But according to Chagnon, this is 'so far as the senior author is concerned, a unique event: he has never heard of a similar instance anywhere in the tribe' (Chagnon et al., 1979: 304).

Primatologist Richard Wrangham (1999) offers an explanation asserting that both chimpanzee and human males have a genetically rooted tendency to raid and kill members of neighboring groups when (a) there is a state of intergroup hostility and (b) one group has such preponderance in strength that it can raid with impunity, with no fear of losses (1999: 1, 12). Probably few anthropologists would take issue with the likelihood of an attack under these circumstances. The questions Wrangham does not address are: how you get (a), and how common is (b)? The Yanomami are the only specific people noted whose raiding is said to be 'strikingly similar' to chimpanzee conflict patterns observed at Gombe in Tanzania (1999: 23; Wrangham and Peterson, 1996: 64–72). But the similarity is only superficial. The patrolling of borders, which Wrangham says is 'an intrinsic component' of his model (1999: 7), is absent among Yanomami; and Chagnon (1968a: 130–3), as well as everyone else who has discussed Yanomami raiding, documents great danger *expectable* for raiders, both on the raid itself, and in the likelihood of retaliation. Thus what is really striking are the *differences* between Gombe chimpanzee and Yanomami violence. Wrangham and Peterson (1996: 69) acknowledge that differences do exist, but assert that this 'needn't blind us to the common threads. Like Yanomamo villages, chimpanzee communities are kinship groups based on

aggregates of closely related males and unrelated females who have emigrated from other kinship groups'. Unfortunately for this thesis (also see Wrangham and Peterson, 1996: 65–6), it misconstrues Yanomami marriage practices. As Chagnon (1968a: 69–73) describes in detail, in his pre-sociobiological writings, the preference and typical pattern is for women to marry *within* their own village.

Sociobiology founder E.O. Wilson, in a recent widely acclaimed book, continues to assert his earlier claim (1978: 107–11) that: '*Territorial expansion and defense* by tribes and their modern equivalents the nation states is a cultural universal' (Wilson, 1998: 185, emphasis in original). Wilson has written extensively on the Yanomamo, including the introduction to the trade version of *Yanomamo*, where he says that in being 'fiercely combative and territorial', they represent 'the conditions under which the human mind evolved biologically during deep history' (1992: ix–x). But in one of his first publications on the Yanomamo, Chagnon (1968b: 110) wrote regarding their warfare: '*the conflicts are not initiated or perpetuated with territorial gain as an objective or consequence*' (emphasis in original). Chagnon's student Hames (1983: 420–3) later took up the question of territoriality again, specifically in reference to hunting lands, and came to the same conclusion.

Founding figures in evolutionary psychology (see Horgan, 1999: 167–73), John Tooby and Leda Cosmides (1988), argue that the ability of humans and a few other species to cooperate in 'coalitional aggression' is based upon a 'Darwinian algorithm' that makes the risks reproductively worthwhile. This 'risk contract of war' involves three necessary features: 'cheaters or non-participants must be identified and excluded (or punished). More generally, the coalition is not stable unless the participants are rewarded or punished in proportion to the risks they have run, and in proportion to how important their contribution was to success' (1988: 5). The Yanomamo are the only specific ethnographic case they cite in this paper, for instance to make the point that the 'cost of enforcement' of this contract would be prohibitive to get men to attack close kin (1988: 9, but see later). But they provide no citations that indicate the 'contract' is in effect *at all* among Yanomamo, and Chagnon's writings show that it is not. So in a particularly intense inter-village pounding match, when one side was losing, the headman 'recruited' young and old men who had stood aside to step up, but these retired after one blow (Chagnon, 1968a: 119). Or when a raiding party left to attack another village, men began to trickle back the very next day, feigning sore feet and upset stomachs (1968a: 130). And when one village was under threat from several villages, men from uninvolved groups joined in the raids because they 'stood a good chance of abducting women while being relatively immune to punitive raids' (Chagnon, 1968a: 41). So 'cheaters' abound, and those who take minimal risks are free to make off with the prime 'reproductive' reward.

R. Paul Shaw and Yuwa Wong (1987, 1989) offer a sociobiological kin selection model of war, arguing that the 'genetic seeds of warfare' are expressed in an evolved tendency toward in-group amity and out-group enmity, beginning with clusters of kin and extending up through tribes and nations. Their sole evidence for this prediction (Shaw and Wong, 1989: 33–4) at its roots is Chagnon and Bugos's (1979) analysis of the genetic relatedness of two sides in a wild altercation – also recounted in the educational film *The Ax Fight* – where it is shown that the men on each side are *genetically* (1979: 222) more closely related to each other than to men on the other side. This conclusion when two local groups fight would hardly surprise most anthropologists, but the significance

of the finding and the role of kin selection in violent contests are questionable, given the selectivity of the particular case. Findings would *expectably* differ if it was a case where a division of one group went over to join their former enemies in attacking their kin, as occurred in the war that Chagnon observed (1968a: 120).

But more fundamentally, before his turn to sociobiology, Chagnon (1968a: 59–67) repeatedly dismissed the significance of genetic relatedness among men in conflict.

> The most bitter fighting, in fact, takes place between members of different villages who are related to each other agnatically . . . The kinship ties between agnates who live in the same village are likewise quite weak . . . The relationship between a man and his brothers of approximately the same age are generally not amicable. (1968a: 66–7)

Or,

> Again, village politics are such that notions of agnatic solidarity count for very little compared to the opportunism characterizing inter-village relationships . . . Thus two groups linked by agnatic ties may be on neutral terms with each other, and one of the groups may be actively conducting a war against a group allied with the other. Yet the one group will not be compelled to side with its agnates in the struggle, and might even take sides with the strangers, especially if marriage obligations exist between them. (Chagnon, 1968b: 143)

Thus when the Monou-teri were raided in retaliation for their own raid, two of the men who shot and killed the Monou-teri headman were his classificatory brothers, that is, members of the same 'lineage' (1968a: 126), and similar killings occurred in several other instances (1968a: 59).

Finally, there is cultural 'pseudospeciation', the idea that enemies are seen as less than human and therefore acceptable to kill, posited by Eibl-Eibesfeldt (1979: 109–11), which is closely related to the view that people have evolved to go to war against strangers and others who are culturally different from themselves (Fox, 1992/3: 16–17; Ghiglieri, 1999: 211–12). In response, one might simply note that most Yanomami warfare involves killing other Yanomami, and Yanomami translates as 'human being'. But more than that, in Chagnon's recent 'Chronic Problems in Understanding Tribal Violence and Warfare', he writes:

> One of the most serious sources of confusion is the assumption that, in the primitive world, wars start between territorially defined entities that are politically independent of each other . . . Wars in the primitive world have deep roots, usually involved repetitive conflicts between individuals who know each other and have axes to grind for personal reasons . . . In short, much of the fighting in 'primitive war' is very personal, contenders often know each other well. (Chagnon, 1996: 218–19)

Such evidence suggests that pseudospeciation is a pseudo-explanation of war.

CONCLUSION

The perennial question is, why do people make war? But that simple question masks complexity. There are many 'whys' to ponder. Why do human beings sometimes think

it is worth risking life to kill others? Why do Yanomami fight as they do, compared to other ethnographic cases? Why is it that in some Yanomami times and places, there is a lot of war, and in others, none? Why do certain local groups, even individuals, decide to attack certain others? Plus there are other related behaviors to be explained, from village relocation to wife-beating. The two materialist approaches I present here represent an effort to develop coherent, fully specified theory which relates to all those questions, with clear predictive expectations, and supported in a systematic way by empirical evidence.

Then there are cultural approaches. Compared to my own, four points can be made. (1) Peters claims that competition over Western goods explains war up to but not after the founding of his mission, when cultural values are more explanatory. In *YW* I dealt with those cases in a way that I believe answered, in advance, some of Peters's points, and I hope to respond in detail to his substantive critique in future work oriented more to actual cases. But the fact that we can get down to arguing about real, specific incidents is an important development in itself. (2) Several fieldworkers claim that Yanomami warfare in fact is the expression of a variety of specific cultural values, such as quests for revenge or women. I agree that those are involved, but see them as rarely sufficient grounds for war on their own, and more typically as part of a culturally integrated motivational package grounded in disparities in trade resources. (3) Lizot and especially Albert make the case that my approach fails to consider adequately the hermeneutics of Yanomami warfare, the layers of meaning that affect action. I accept this criticism as valid, but see such symbolic elaborations as building on practical material interests. Interpreting that way opens an avenue for productive synthesis of materialist and symbolic approaches. (4) Lizot also advances a more aggressive idealist agenda, claiming it is ideas, *not* situational practicalities, that explain both war and peaceful relations. Here our understandings are in direct contradiction.

With biological explanations of Yanomami warfare I see less ground for complementarity. My objections in this instance are not in the nature of that theory, although I certainly do have objections along those lines (see Ferguson, 2000b). Rather it is the fact that biologistic explanations are so consistently directly contradicted by Yanomami data, even from the researcher Chagnon, who would be expected to provide support for those positions. Yanomami do not start wars to capture women. What are interpreted as 'reproductive conflicts' between men over women precede only some instances of war, and then as only one of many issues, with others being more predictive of actual violence. No evidence supports the conclusion that Yanomami men increase lifetime reproductive success by participating in a killing; they more likely lower it. Young unmarried childless males are minor players in Yanomami wars, which are typically decided on and carried out by middle-aged men with children. There is no basis for implying a pattern of Yanomami males requiring the death of previous children brought into a marriage. Yanomami raiding does not resemble, but directly contrasts in critical ways with 'raiding' patterns of Gombe chimpanzees. Yanomami warfare is not about territory. No 'Darwinian algorithm' operates to reward lead participants and punish 'cheaters' in Yanomami warfare, quite the opposite. Yanomami conflicts sometimes do but sometimes do not parallel lines of genetic relationship, but ethnographic evidence shows that blood ties have little if any effect in shaping choices of which side to support. 'Cultural pseudospeciation' is not a factor in wars between Yanomami groups. All together, it is hard to imagine a more widespread, thorough invalidation of an approach than what Chagnon's

own writings do to biologistic explanations of war. Unfounded speculation based on imaginary evolutionary scenarios will not help us understand the whys of war.

Note

1 'Yanomami' and 'Yanomamo' are two of a variety of names applied to the people discussed in this article, a people who are divided into four or five distinct languages. As I use the terms, Yanomamo designates the westernmost language group, including the people studied by Napoleon Chagnon and others around the confluence of the Mavaca and Orinoco rivers. Yanomami designates a larger cultural or ethnic category, encompassing all of the language groups, including Yanomamo, Sanema, Ninam, and Yanomam.

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