

All talks will take place in the Erb Memorial Union Gumwood Room

Thursday 16th Morning: ORIGINS

8:30 Coffee and snacks

8:45 **Frances White**, Director, Institute of Cognitive and Decision Sciences. *Introduction and Welcome.*

9:00 **Mike Waller & Frances White**

Evolution of coalitionary violence in primates: Why no lethal raiding in bonobos?

10:00 **Richard Wrangham**

The imbalance-of-power hypothesis and the evolution of war

11:00 Break

11:10 **Steve Frost**

Evidence for coalitional aggression in the hominid fossil record

12:10 Lunch break

Thursday 16th Afternoon: SELECTION PRESSURES RELATED TO THE EMERGENCE OF HUMAN WARFARE

1:30 **Steven Le Blanc**

*Recent hunter-gatherer warfare as a model for
our evolutionary past*

2:30 **John Patton**

Achuar warfare

3:30 Break

3:40 **Pat Lambert**

*War histories in evolutionary perspective:
Insights from prehistoric North America*

**Friday 17th Morning: *CROSS-CULTURAL PATTERNS IN
HUNTER-GATHERER WARFARE***

8:30 Coffee and snacks

9:00 **Samuel Bowles**

*Was Warfare among Ancestral Foragers
Sufficiently Common to Affect the Course of
Human Evolution?*

10:00 **Chet Savage**

Lethal treachery and the breakdown of alliances: Decision-making in an environment of revenge and distrust

11:00 Break

11:10 **Phil Walker**

Human Body Part Trophy-Taking and the Evolution of Warfare

12:10 Lunch break

Friday 17th Afternoon: MAPPING THE PSYCHOLOGICAL PROCESSES OF WARFARE

1:30 **John Tooby**

Cognitive logic of coalitional aggression

2:20 **Mark Van Vugt**

The male warrior hypothesis: Evolution, gender, and the psychology of intergroup conflict

3:40 **Joshua Duntley**

Evolutionary psychology of war

**Saturday 18th Morning: COALITIONAL AGGRESSION IN
MODERN ENVIRONMENTS**

9:00 **Aaron Blackwell & Lawrence Sugiyama**

When is self-sacrifice adaptive?

10:00 **Rose McDermott**

Sex differences in a simulated war game

11:00 Break

11:10 **Randy Thornhill**

*Infectious disease, collectivism-individualism,
and civil war*

12:10 Lunch break

Saturday 18th Afternoon: OVERVIEW

1:30 **Mark Flinn**

Hormonal mechanisms for human male coalitions

2:30 **Dominic Johnson**

Squaring off: Lanchester's laws of combat in human evolution

3:30 **Napoleon Chagnon**

Human conflicts and warfare in history: An evolutionary assessment

CONFERENCE ABSTRACTS

Thursday 16th Morning: ORIGINS

Mike Waller & Frances White

Department of Anthropology and Institute of Cognitive and Decision Sciences, University of Oregon

Evolution of coalitionary violence in primates: Why no lethal raiding in bonobos?

Intraspecific coalitionary violence is predicted to evolve in primate social groups when the fitness benefits outweigh the costs. There are many potential benefits from both individual and coalitionary violence to males include sexual coercion and influence of intersexual election, gaining ecological resources such as increased home range or territory, and

increasing access and control of fertile females. Benefits are reduced when individual male strategies are more successful than group action. Costs are minimized when benefits are shared among relatives and power differentials between competing groups are maximized. There are few benefits and many costs to females. We compare these factors in two related species: chimpanzees that show male coalitionary violence and lethal raiding and bonobos that do not. We examine the ecological bases for the selective advantage of coalitionary violence, especially the impact of the distribution and abundance of both ecological resources and fertile females. In addition, we examine the impact of females' sociality and solidarity on the selective advantage of male aggression. We conclude that the critical condition for the evolutionary advantage of coalitionary violence in genus *Pan* lethal raiding is the distribution of females, which in turn reflects the ecological food base. We expand this to a consideration of the ecological conditions associated with the hominin fossil record to evaluate where we might expect to see conditions favorable to the evolution of warfare.

Richard Wrangham
Harvard University

The imbalance-of-power hypothesis and the evolution of war

The imbalance-of-power hypothesis states that an evolutionary history of communal territoriality combined with fission-fusion grouping favors the tendency to kill rivals when the costs are perceptibly low. Here I review this hypothesis, which was derived from chimpanzees and other mammals, and apply it to hunter-gatherers. I consider differences between nomadic and complex hunter-gatherers, and the evolutionary significance of each system. I propose that complex hunter-gatherers may have been disproportionately important for the evolutionary psychology of war because they have likely been sufficiently common, ancient and successful to have contributed genes to nomadic populations. This review generates minor modifications to the imbalance-of-power hypothesis, but finds that it provides a useful framework for understanding hunter-gatherer violence.

Steve Frost and Katerina Harvati

Department of Anthropology, University of Oregon

Evidence for intergroup violence in the human fossil record

There are many theoretical reasons to suspect that intergroup violence has deep evolutionary origins for humans, and there is strong evidence for its presence in the latest Pleistocene and Holocene archeological records. Demonstrating direct evidence for intergroup violence in the earlier human fossil record poses considerable difficulties from small sample sizes to diverse, complex taphonomic and contextual issues. Possible indicators for violence in the hominin fossil record has taken three forms: 1) instances, morphology, and patterns of skeletal trauma observed in fossil remains; 2) postmortem modification of hominin remains by other hominins, specifically defleshing and other processing possibly for consumption; and 3) demographic profiles from a few relatively large assemblages that may differ from what would be expected for a paleolithic attritional mortality profile. All three of these lines of evidence are reviewed. Neanderthals make up the largest part of the pre-*H. sapiens* record in this regard, but there is some additional evidence from *H. heidelbergensis* (or its contemporaries). While intergroup violence remains a plausible explanation for some of these phenomena, in nearly all cases, alternative explanations can not be adequately ruled out. Consequently, the current evidence for intergroup violence in the non-modern hominin fossil record must currently be considered equivocal.

Thursday 16th Afternoon: SELECTION PRESSURES RELATED TO THE EMERGENCE OF HUMAN WARFARE

Steven A. Le Blanc

Director of Collections, Peabody Museum of Archaeology and

Ethnology, Harvard University

Recent hunter-gatherer warfare as a model for our evolutionary past

For most of history, humans have lived as hunter-gatherers. Thus, any selection for a biological component to warfare behavior would have occurred almost entirely among hunter-gatherers. Yet, there has been surprisingly little work done to understand the nature and intensity of hunter-gatherer warfare. Because many of the ethnographically known hunter-gatherers lived in worlds dominated by farmers and are thus of limited relevancy, this paper is an attempt at summarizing what is currently known about hunter-gatherer warfare in a world of hunter-gatherers. The questions of what societies are potential useful models for the past is considered, and what types of relevant societies might not be represented by recent ethnographic cases. The goal is to go beyond just the simple question of whether hunter-gatherers had warfare, and to begin to characterize hunter-gatherer warfare in behavioral terms.

John Patton

Department of Anthropology, California State University at Fullerton

Achuar warfare

(Pending)

Patricia M. Lambert

Department of Anthropology, Utah State University

War histories in evolutionary perspective: Insights from prehistoric North America

Human skeletal remains from archaeological sites in North America

provide a 10,000+ year record of human social interactions—both peaceful and violent—across a broad and diverse landscape, and an unparalleled opportunity to empirically test warfare causation models. When examined within the context of recent and emerging data on aggression and violence in modern human and non-human primate societies, these longitudinal data reveal behavioral continuities between the past and present, and across species, that argue strongly for the evolutionary significance of human aggression and for the importance of distinguishing proximate from ultimate causation when attempting to understand human motivations for violence and war. In this paper I review the osteological evidence for violence and warfare in prehistoric North America, and then situate these data within a broader explanatory framework drawn from evolutionary theory, evolutionary psychology, neuroscience, primatology, military science, and the study of recent and modern war histories as these have played out across a global landscape.

Friday 17th Morning: *CROSS-CULTURAL PATTERNS IN HUNTER-GATHERER WARFARE*

Samuel Bowles

Santa Fe Institute and University of Siena

Was warfare among ancestral foragers sufficiently common to affect the course of human evolution?

Since Darwin, inter-group hostilities have figured prominently in explanations of the evolution of human behavior. Yet the extent of lethal inter-group conflict among ancestral humans in the late Pleistocene and early Holocene remains controversial. I evaluate the evidence using the lens of evolutionary modeling and simulations: was the probable level of inter-group lethal conflict sufficient to exert a significant influence on the evolution of human behavior? Foragers leave few archeological traces and the historical record contains few pre-contact histories extending over more than a half a century. But we can make inferences from the available data, namely: what is known about hunter gatherer demographics and late Pleistocene and early Holocene climate, archeological evidence on causes of deaths during

the late Pleistocene and early Holocene and ethnographic and historical reports on recent foragers. These data suggest that inter-group contact was extensive and that for some periods and groups conflict was probably common and often lethal. Simulations show that mortality due to inter-group competition is sufficient to have had significant effects on human evolution.

Reed L. Wadley and Chet Savage (with grateful acknowledgement to Raymond Kelly)

Department of Anthropology, University of Missouri-Columbia

Lethal Treachery and the Breakdown of Alliances: Decision-making in an environment of revenge and distrust

Lethal treachery, the deliberate use of social contact to carry out assassinations or large-scale killings, is a rare but often effective form of ambush. It is most commonly motivated by attempts of robbery (killing to acquire others' valuables) and the elimination of enemies. In this paper, we examine a particular aspect of the latter – the use of lethal treachery against current and erstwhile allies, and the decision-making environment this entails, particularly regarding its atmosphere of distrust and problems for future alliance building. We use a range of societies to establish the socio-political context for episodes of lethal treachery, to show its relationship with alliance breakdown and alliance building. Our findings are consistent with the “social competition” hypothesis in the evolutionary anthropological literature and add a chilling corollary to its main thesis that stiff competition between individuals in social groups drove much of the evolution of

cooperation in human society.

Phil Walker

Department of Anthropology, University of California at Santa Barbara

Human Body Part Trophy-Taking and the Evolution of Warfare

Paleoanthropological, archaeological, and ethnohistoric data suggest that the use of severed human body parts as symbolic tools for the construction and maintenance of social boundaries is an extremely ancient, culturally ubiquitous human activity. Cut marks on hominin cranial remains possibly related to this activity predate the emergence of modern humans by more than three million years. There is substantial evidence for the practice among archaic and early modern *Homo sapiens*, which is telling given the paucity of fossil specimens of this antiquity. Evidence for the practice continues unabated up into the present. Body part trophy taking is thus arguably the earliest archaeologically documented human ritual activity and predates the earliest evidence of the intentional burial of bodies by hundreds of thousands, if not millions, of years. The remarkable persistence of this practice over such an enormous span of time and its resistance to eradication, even in modern societies where there are strong social sanctions against it, suggests that consistent competitive advantages have accrued to the individuals and social groups who practice it.

A review of the extensive ethnographic and ethnohistoric trophy-taking literatures reveals some consistent motivational factors underlying an enormous amount of superficial cultural diversity. Based on these cross-cultural consistencies, I argue that the competitive advantages accruing to people who engage in trophy taking derive from the universal symbolic salience of amputated human body parts. The head in particular is a natural symbol of a person's communicative functions and personal identity: when severed, heads serve as powerful symbols of disempowerment and death. Owing to these strong associations, severed body parts are naturally preadapted for use as symbolic tools for construction and

maintenance of favorable social boundaries. In the form of ancestral relics, people often use heads and other body parts to reinforce solidarity within and between groups. In this role, they serve to reify ancestral ties and foster the competitive advantages that accrue to larger, more cohesive social entities. Perhaps more important from a historical perspective is the value that body part trophies have as tools of “pseudospeciation.” Trophies obtained from the bodies of enemies often are exploited as heuristic devices for enculturation of group members. In this context, they serve both to dehumanize the enemy and augment the social standing of the warriors who obtained them.

Friday 17th Afternoon: MAPPING THE PSYCHOLOGICAL PROCESSES OF WARFARE

John Tooby

Department of Anthropology, University of California at Santa Barbara

Cognitive logic of coalitional aggression

(Pending)

Mark Van Vugt

Department of Psychology, University of Kent

The male warrior hypothesis: Evolution, gender, and the psychology of intergroup conflict

Intergroup relations are a fundamental aspect of human social psychology. There are various reasons to suggest that men might be more “intergroupish” than women, given their greater involvement in coalitional conflict throughout our evolutionary history—we dub this the male warrior hypothesis (Van Vugt, De Cremer, & Janssen, 2007). To test this

hypothesis, and its robustness to context, we have collected evidence from a range of experiments and surveys. Experimental findings reveal that, relative to women, men are more likely in intergroup competitions to: (1) sacrifice for ingroups, (2) show confidence in intergroup competitions, (3) attack outgroups, and (4) inhumanize outgroup members. Additional survey data reveal that men, relative to women, (5) recall competitive intergroup interactions more clearly, (6) score higher on social dominance orientation, (7) show greater support for wars in opinion polls, and (8) have an aesthetic preference for war-related materials (films, books, pictures). We speculate about the evolutionary origins of the male warrior effect and note some implications for managing real-world intergroup relations.

Joshua D. Duntley and David Buss

Department of Psychology, University of Texas at Austin

The Evolutionary psychology of war

We propose a co-evolutionary theory of warfare psychology that builds on previous theories of war, including those of Alexander, Chagnon, Hamilton, Ghiglieri, Tooby and Cosmides, Wrangham, and van der Dennen. Its core premises are: (1) Men have evolved warfare mechanisms that women lack; (2) The primary fitness benefits that favored an evolved warfare psychology include acquisition of new mates, resources, and territory, and importantly, eliminating key competitors for those resources; (3) There exist a number of psychological design features that increase the likelihood of success in warfare, including those that facilitate coalitional solidarity, mechanisms for increasing coalitional size, preferential selection of coalition partners who possess physical formidability and psychological bravery, imposing reputational damage on coalition members for cowardice, and motivational mechanisms to induce attack; (4) The fitness costs of becoming a victim of coalitional aggression were so

steep that selection strongly favored the evolution of *anti-homicide defenses* to combat these costs; (5) Psychological design features of defenses against out-group coalitional aggressors include adaptive cognitive biases that produce overestimates of the likelihood of enemy attack, cultivating a reputation as non-exploitable, and a psychology of vengeance that functions to deter rival groups from future attack; (6) The co-evolved defenses, in turn, have selected for additional evolved warfare adaptations designed specifically to circumvent them, including deception about aggressive intentions and decision rules for choosing opportune moments for surprise attack. Discussion focuses on the importance of within-species antagonistic co-evolution in designing adaptations for warfare and anti-homicide warfare defenses.

Saturday 18th Morning: COALITIONAL AGGRESSION IN MODERN ENVIRONMENTS

Aaron D. Blackwell and Lawrence S. Sugiyama

Ph.D. candidate, Anthropology, University of Oregon; Associate Professor, Anthropology University of Oregon

When is self-sacrifice adaptive?

Why do people engage in willing suicidal self-sacrifice? Kin selection explains self-sacrifice in eusocial insects, but humans self-sacrifice is more complicated because humans: 1) are less related to kin than self; 2) exhibit self-sacrifice when direct kin benefits are unclear and/or benefits accrue to larger group members; and 3) live in a variety of ecological and cultural environments. To understand the conditions promoting self-sacrifice, we mathematically model it in terms of kin selection. As expected, where there are no extrinsic rewards for self-sacrifice it is adaptive only under high sibling resource competition. However, when there are extrinsic

gains affecting sibling survival, marriage opportunities, or fertility, self-sacrifice can result in higher inclusive fitness for the self-sacrificer. In particular, in cultural settings in which marriage depends on brideprice or status, families are large, and resources are limited, payments or status benefits from suicide attack are predicted to make such self-sacrifice ultimately adaptive. Placed into general terms, self-sacrifice can be adaptive whenever limited resources are shared by kin, there is high variance in reproductive success, and self-sacrifice results in 1) the elimination of costly competition between siblings or 2) rewards that affect this variance.

Rose McDermott

Political Science, University of California at Santa Barbara

Sex differences in a simulated war game

We have conducted several series of experiments examining sex differences in behavior in a simulated war game. In these experiments, we have found that women spend less money on weapons than men, engage in more friendly communications and are much less likely to go to war. We also have some data on testosterone and cortisol in these studies. Men appear to be highly overconfident about their probability of victory. This overconfidence may have held evolutionary adaptiveness to reduce behavioral leakage in bluffing, encourage more followers to join a cause, and increase behavioral commitment that could increase the chance of real victory.

Randy Thornhill with Corey L. Fincher and Kenneth Letendre

Department of Biology, University of New Mexico, Albuquerque

Infectious disease, collectivism-individualism, and civil war

Geographic and cross-national variation in the frequency of civil war is a subject of great interest for political scientists. We propose and test a new theory of civil war. Fincher et al. (2008, *Proceedings of the Royal Society of London B* 275, 1279-1285) and Fincher and Thornhill (in press, *Oikos*) have

proposed a theory of human social behavior based on variation in infectious disease stress. Infectious disease stresses are spatially variable across the range of a human culture leading to localized host-parasite co-evolutionary races. This results, across the culture's range, in a contagion-risk mosaic of immunological similarity with local conspecifics and immunological dissimilarity with non-local conspecifics. In this view, natural selection created condition-dependent psychological adaptations that function to measure parasite stresses locally and yield appropriate parasite defense and management ideologies and associated behaviors. These values and behaviors correspond to the collectivism-individualism continuum, the paradigmatic dimension of cross-cultural psychology. Collectivism is for coping with high parasite stress via priority of recognizing and maintaining in-group and out-group boundaries, in-group allegiance and support (ethnocentrism), and devaluation and dislike of out-groups (xenophobia). Individualism is for achieving benefits from out-group interactions and alliances and is optimal under low parasite stress. Fincher et al. (2008) showed that as predicted parasite stress is strongly, positively correlated with degree of collectivism (and hence negatively with individualism) among the contemporary countries of the world. Based on this theory of social behavior, we predict that high parasite stress and its associated collectivist values of ethnocentrism and xenophobia will promote high civil war activity across the countries of the globe whereas low disease stress and associated individualism will promote low civil war activity. Cross-national measures of civil war frequency and duration support the prediction. In this research, we also evaluate earlier published hypotheses for civil war.

Saturday 18th Afternoon: OVERVIEW

Mark Flinn

Department of Anthropology, University of Missouri-Columbia

Hormonal mechanisms for human male coalitions

Humans are unusual in having the combination of (1) extensive male parental effort, (2) relatively exclusive, long term mating relationships, (3) mutual respect for other males' mating relationships, (4) communities composed of many males from multiple kin groups, and (5) inter-coalitionary aggression. The neurological and hormonal mechanisms that underpin this unique suite of behavioral traits is unknown.

Here I present data from a 20-year study of a rural community on the island of Dominica. Testosterone and cortisol response to competitive events among males within a coalition are different than responses among males from different coalitions. Similarly, males have different hormonal responses to females that are attached to close friends than to unattached females, or females attached to males that are not close friends. These results suggest an evolved hormonal basis for cooperation among human males.

Dominic Johnson

Princeton Society of Fellows and Woodrow Wilson School of Public and International Affairs.

Squaring off: Lanchester's laws of combat in human evolution

Lanchester's (1916) laws of combat have long been used in operational research by the military, and have recently been applied to explain patterns of conflict in animals such as ants, lions and chimpanzees. There are two laws: *Lanchester's Linear Law* shows that, where combat is fought as a series of one-on-one duels, combat power is proportional to group size; *Lanchester's Square Law* shows that, where combat is fought as an all-against-all melee, combat power is proportional to the *square* of group size (i.e., a force three times larger than its enemy is actually nine times more powerful in combat). This is because of the larger group's ability to concentrate multiple attacks on individuals among the weaker side, leading to more effective killing. The difference between the Linear Law and the Square Law suggests that humans may

have evolved one of two possible psychological adaptations to conflict assessment: (1) if warfare was primarily duel-like in human evolutionary history, then we should expect cognitive mechanisms that equate the probability of victory with group size; (2) if warfare was primarily melee-like in human evolutionary history, then should expect cognitive mechanisms that equate the probability of victory with group size *squared*. Richard Wrangham's (1999) "imbalance-of-power hypothesis" makes a strong prediction here. Wrangham argues that the primary mode of combat in social carnivores, chimpanzees and throughout most of human evolutionary history was melee-like—inter-group conflict almost always occurs when an attacking side has an overwhelming power advantage and gangs together to ambush and kill rival group members at little cost to themselves. If so, human cognition has been subject to several million years of Lanchester's Square Law (not the Linear Law). Given that the actual combat power of a given group is greater than it would appear to available visual stimuli (group size squared rather than group size per se), I propose that natural selection would have favored a bias that "corrects" inter-group assessments in order to exploit the consequences of Lanchester's Laws. The only bias that could achieve this correction is a bias to *overestimate* one's apparent advantage when one is on the stronger side—"my gang of three is not three times stronger than my enemy, but nine times stronger". Interestingly, the same logic also predicts a bias to *underestimate* one's chances when one is outnumbered. Extreme fear of superior numbers may also be adaptive. The consequences of a Square Law psychology has major implications for understanding military incompetence and overconfidence in modern war, because modern conflicts and modern weapons generally do *not* conform to Lanchester's Square Law (fighting is no longer melee-like). The problem is that human brains may nevertheless continue to make their assessments based on that faulty heuristic, and thus cause violence, aggression, and war even when the probability of winning is low.

Napoleon Chagnon

Department of Anthropology, University of California at Santa

Barbara

Human conflicts and warfare in history: An evolutionary assessment

Acquiring additional females of reproductive age has probably always been the most prized outcome of inter-group conflict in the long history of our species and the purpose for which these conflicts most often arose in the earliest part of that history. Polygyny was relatively inexpensive for most of that history because acquiring the material wherewithal to support extra wives/mates was less dependent on first obtaining 'wealth' to support extra wives and more dependent on the ability to manipulate coalitional male alliances that effectively deployed lethal violence and the threat of lethal violence to this end. Perhaps if we viewed the human ability to harness, control, and prudently deploy violence for reproductive advantage, we could consider it the most important of all "strategic" resources. In my view, the historically recent emphasis in the Social Sciences on wealth and control of scarce, strategic material resources in the political evolution of *Homo sapiens* applies only to the last flicker of an eyelash in the environments of human history...perhaps emerging only in the most recent 8,000 years of human history. Indeed, the whole purpose and design of the social structures of tribesmen seems to have revolved around effectively controlling sexual access by males to nubile, reproductive-age females. I submit that the purpose or *function* of "social organization" among tribesmen (and many non-human animals) seems to be the efficient regulation of *sexual access to females by males* and *the role that male coalitions play in this process*. This is often accomplished by a variety of ways in the non-human animal world: expulsion or departure from the group of one of the adult sexes; territoriality; ranked hierarchies in the breeding system by age or rank dominance; breeding systems based on lek displays among males; sexual selection of exaggerated secondary dimorphic sexual traits, etc. Among humans most of this order is 'embedded' in and orchestrated by the systems of descent, kinship classifications, marriage rules, and incest proscriptions that humans have developed...the stuff that is the central--and increasingly ignored--subject of cultural anthropology.