

THE EVOLUTION OF HUMAN AGGRESSION: LESSONS FOR TODAY'S CONFLICTS

Presentation Abstracts

Keynote 1

Destined to Wage War Forever? The Evolution of Peacemaking Among Primates.

Frans B. M. de Waal

Living Links, Yerkes Primate Center, Emory University

Following the Second World War, scientists were naturally fascinated with the aggressive "instinct" in humans and animals. In the 1970s, evolutionary biology added the view of animal social life as an arena of competition. At about the same time, however, primatologists began to emphasize long-term social relationships. The discovery of reconciliation behavior came out of this tradition, confirming the impression that societies constitute a balancing act between cooperation and competition. Reconciliation - defined as a friendly reunion between former opponents - has since been confirmed in many different species, in both captivity and the field, both experimentally and observationally. Chimpanzees, for instance, kiss and embrace after a fight. Reconciliation has also been demonstrated in non-primates, such as dogs and dolphins. This behavior truly serves what its name suggests, i.e. to repair social relationships. The dominant idea (known as the Valuable Relationship Hypothesis) is that reconciliation will occur whenever parties stand much to lose if their relationship deteriorates. This means that peacemaking depends on overlapping interests, a situation common within but rare between primate groups. In our own species, however, interdependencies between groups or nations are not unusual, and in fact increasing, making for applicability of these models to international relations.

Panel 1: Conflict and Conflict Resolution among Great Apes.

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

Richard Wrangham

Harvard University

Among vertebrates, lethal intergroup aggression has traditionally been regarded as being unique to humans, and human warfare has therefore been widely interpreted as an evolutionary aberration due to social construction. The discovery since the 1970s that chimpanzees kill adult members of neighboring social groups has challenged the social construction hypothesis. Here I review the imbalance-of-power hypothesis, which states an evolutionary history of communal territoriality combined with fission-fusion grouping favors the tendency to kill rivals when the costs are perceptibly low. Current data on chimpanzees, bonobos and other mammals support the imbalance-of-power hypothesis and suggest that in certain species natural selection has favored a

drive to dominate neighboring communities through attempts to kill. I suggest that the imbalance-of-power hypothesis also provides a useful basis for understanding intergroup violence in small-scale human societies, but that it needs to be modified to take account of human-specific attributes such as reward systems and political complexities. The proposal that human intergroup aggression has its evolutionary origins in an imbalance-of-power system means that violence will emerge predictably when groups have sufficient power, but that violence is suppressed in conditions without intense power imbalances.

Evolutionary Perspectives on Conflict Resolution

Joan B. Silk

Department of Anthropology and Center for Society and Genetics, University of California, Los Angeles

Sociality is favored by natural selection because it makes animals safer from predation or enables them to collectively defend access to resources. At the same time, living in close proximity to conspecifics can lead to conflicts of interest and competition. In a number of animal taxa, including many nonhuman primate species, evolution has favored an effective mechanism for resolving conflicts with group members: they engage in peaceful contacts with former opponents in the minutes that follow conflicts. There is a broad consensus that these reconciliatory interactions relieve the stressful effects of conflict and permit former opponents to interact peacefully, but less consensus about their adaptive function. Primates may reconcile to obtain short term objectives, such as access to desirable resources. Alternatively, reconciliation may preserve valuable relationships damaged by conflict. Some researchers view these explanations as complementary, but they generate different predictions about the patterning of reconciliation that can be partially tested with available data. There are good reasons to question the validity of the relationship-repair model, but it remains firmly entrenched in the reconciliation literature, perhaps because it fits our own folk model of how and why we resolve conflicts ourselves. It is possible that the function of reconciliation varies across taxa, much as other aspects of cognitive abilities do.

Chimpanzee Politics: Pacifying Interventions and Reconciliation

Frans B. M. de Waal

Living Links, Yerkes Primate Center, Emory University

Chimpanzee males form coalitions within the group in pursuit of high rank. These coalitions are formed opportunistically, and may involve high risk, including fatal aggression. High ranking males perform a control role in that they break up fights among others. This behavior has group-wide repercussions as demonstrated in an experiment on a different species. Flack et al. (2005) removed control males from a large captive macaque group for brief periods of time, and each time measured a deterioration of social relationships in the remainder of the group, including a sharp drop in reconciliation behavior. Reconciliation, which has been demonstrated in a great variety of primates and other animals, affects stress levels, social tolerance, and long-term social relationships, hence is an essential component of group harmony.

Sexual dimorphism and aggression in primates: just where do humans fit in?

Michael Plavcan

Anthropology, University of Arkansas

Male primates are often much larger than females, and equipped with large canine teeth (dimorphic). Humans, on the other hand, show comparatively modest differences in body size, and lack large canine teeth. These characters are often associated with monogamy and affiliation in humans. However, comparative analyses more closely tie dimorphism with degrees of intra-sexual aggression and differences in reproductive success among males. The closest relatives of humans – the great apes – show a gradation of dimorphism that appears to track the degree of relatedness to humans. Gorillas and orangutans are intensely dimorphic, and chimpanzees much less so. Many models for the evolution of human behavior use chimpanzees as an analogue for an ancestral condition. But data from the fossil record strongly contradict this assumption, suggesting that behavioral similarities between chimpanzees and humans associated with reduced dimorphism evolved in parallel, and that modern humans are derived independently from a strongly dimorphic ancestor. This has important implications for understanding whether human patterns of aggression and affiliation represent an inherited condition, or have separately evolved as part of a unique human adaptation.

Keynote 2

Nothing to Lose? Economic Inequality, Poor Life Prospects, and Lethal Competition.

Martin Daly & Margo Wilson

Department of Psychology, McMaster University

The majority of homicides are the culminations of competitive confrontations between young men, and the immense variation in homicide rates is primarily due to the variable incidence of such contests. The most successful predictor of homicide rates has proven to be the intensity of economic competition, as indexed by income inequality. But which particular men are at risk? In large measure, it is those whose lives are going nowhere unless they escalate their competitive tactics.

Thinking about homicide in this way has led us to a number of discoveries about its demography and epidemiology, which we will review. We will also address the questions of why homicide rates declined in much of the developed world in recent decades although income inequality was on the rise, and whether cross-cultural variability in attitudes and values provides an alternative to economic explanations for the remarkable variability in homicide rates between and within nations.

We do not suggest that killing *per se* can be understood as either rational or fitness-promoting. Homicides are relatively rare dénouements of hostile confrontations, and it is in the modulation of men's willingness to engage in risky competition that adaptation should be sought.

Panel 2: Coalitionary Violence and Warfare

A History of Violence

Steven Pinker

Harvard College Professor and Johnstone Family Professor, Department of Psychology, Harvard University

Contrary to the popular impression view that we are living in extraordinarily violent times, rates of violence at all scales have been in decline over the course of history. I explore how this decline could have happened despite the existence of a constant human nature.

Americans at War: Evolutionary Perspectives on an Age Old Story

Patricia M. Lambert, Utah State University

The archaeological record of North America is rife with evidence for war, both prehistoric and historic. Ancient palisade lines, cliff dwellings, towers, entrenchments, burned villages, no-man's-lands, war weapons, and war dead attest to a history of conflict extending far back beyond the arrival of Europeans and the establishment of the United States. These remnants of the past are fascinating, insightful, and historically important—but are they relevant to the topic of conflict management in the 21st century? The purpose of this paper is to explore the value of this longitudinal record for revealing the larger causal forces that underlie intergroup conflict, forces that are often masked in the modern world by proximate triggers such as hotel bombings and suicide attacks, and thus difficult to identify. History has shown us that conflict resolution is a challenging endeavor, but those efforts that take underlying causation into account may have a better chance of resolving today's conflicts and heading off those that threaten our collective future.

Male Hierarchies, Parent-Offspring Conflict, and Warfare in Papua New Guinea

Polly Wiessner

Anthropology, University of Utah

Population growth and the increase of young men in proportion to older men are associated with accentuated coalitional violence worldwide. Here I will propose that an extension of parent-offspring conflict provides a powerful framework for understanding the course of coalitional violence. Older men seek to manipulate inter-group competition to provide optimal resources and security for their offspring and those of their close collaterals. In contrast, young men seek to demonstrate physical prowess and willingness to sacrifice for the group to reap individual reputation and rewards. In periods of demographic or technological stability, older men with control of resources, knowledge, and networks prevail. With rapid change, younger men are able to disrupt the male power hierarchy, generating chaos.

I will draw on a case study from the Enga of Papua New Guinea to illustrate how parents parent/offspring conflict is played out in the context of warfare in pre-

colonial and modern times young men in the driver's seat, and what older men are doing about it.

Panel 3: Further Discussion of Coalitionary Warfare

Warfare and Human Ultrasociality

Peter Turchin

Ecology and Evolution, University of Connecticut

How did human ultrasociality - extensive cooperation among large numbers of unrelated individuals - evolve? What are the social forces that hold together complex societies encompassing hundreds of millions of people? Using theoretical insights from models of multilevel selection I argue that there is a fundamental connection between human ultrasociality and warfare. It was intergroup conflict that generated selective pressures for increasing scale and complexity of human societies. I illustrate this social evolutionary dynamic with two examples. The first is the rise of historical megaempires on the frontiers between settled farmers and nomadic pastoralists. The second one is the transformative influences of the Indian Wars on the European settlers in North America.

From Lab to War: The Role of Biology and Psychology in Political Aggression

Dominic D. P. Johnson

Politics & International Relations, University of Edinburgh

I present results from a series of laboratory experiments demonstrating that human biology and psychology have significant influences on the probability of aggression. In interactive war-game experiments over networked computers, we found that: (1) men (not women) were over-confident about winning, and those who were more over-confident were more likely to attack their opponents; (2) second-to-fourth finger length ratios (2D:4D), a possible biomarker of pre-natal testosterone exposure, also predicted the probability of attacking. In our most recent experiments, we found that: (3) behavioral aggression (willingness to inflict harm on others) was significantly associated with MAO-A (monoamine oxidase A) gene, especially in response to provocation. Finally, in hypothetical international crisis scenarios, levels of aggression in subject's chosen policy options (which ranged from withdrawal, to negotiation, to military attack) were significantly predicted by: (4) political partisanship (Democrat-Republican affiliation, and a general liberal-conservative scale); and (5) subjects' confidence that their chosen policy would succeed. I conclude by arguing that physiological and psychological influences on aggression were adaptive in our evolutionary past because they promoted survival and reproductive success. However, these same mechanisms are often costly and maladaptive in today's very different social and political environment. If we ignore the biological bases of aggression, we will only make the task of prediction and prevention harder.

Panel 4: Hormones and Human Dominance and Aggression

The challenge of testosterone

John Archer, Department of Psychology, University of Central Lancashire

Chronic high levels of testosterone exert evolutionary costs. A common response to this is in males of many species is to have a neuroendocrine system that is responsive to situations that require high testosterone levels rather than maintaining consistent high levels. Evidence from studies of testosterone and behavior in humans is assessed in relation to whether human males fit this pattern. It is concluded that they do, and also that there are individual differences associated with testosterone levels indicative of specialization for mating or parental effort.

Ontogeny of hormonal mechanisms for coalitionary aggression

Mark Flinn

University of Missouri, Columbia

Humans have an unusual suite of traits, including: (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, (5) inter-community aggression, and (6) a long period of juvenile dependence. The neurological and hormonal mechanisms that underpin this unique suite of behavioral traits are uncertain, but may provide important clues about the selective pressures that guided human evolution.

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 adult males within a coalition are different than responses among males from different coalitions. Similarly, adult 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. We are currently studying the ontogeny of these distinctive hormonal responses. During middle childhood, boys and girls show behavioral differences in play and social interactions: boys tend to invest more time in organizing groups of peers, among which they form hierarchies, and compete with other groups. Conversely, girls usually invest more time in dyadic interactions with similar age girls, caring for siblings, and doing domestic chores. How the onset of male coalitional and female dyadic psychobiology and life history trajectories are related to social events is yet an open question. We are examining the onset of adrenarche, pubarche, and individual differences in DHEA (Dehydroepiandrosterone) production using semi-structured, long interviews and a competitive enzymatic immunoassay of saliva samples. Peer network density is assessed by multidimensional scaling (MDS), with the hypothesis that it is denser for boys than for girls. Everyday social interactions are coded from observations and video. Analyses suggest that middle childhood and the unusual temporal patterning of adrenarche are important components in the ontogeny of coalitionary behavior.

The role of physical strength in anger and anger expressions

Aaron Sell

Center for Evolutionary Psychology, University of California, Santa Barbara

Anger can be understood as a cognitive mechanism designed by natural selection to negotiate conflicts of interest in ways similar to, but distinct from, non-human animal conflict. Using an evolutionary biological framework, one can ask under what conditions aggression is mobilized by the anger system, and predict individual differences in thresholds for aggression. For example, because physical aggression was frequently used by men during our evolutionary history to negotiate conflicts of interest, it was predicted and found across different cultures that physically stronger men were more prone to anger. Similarly, physical changes to the face, body, and voice preceding aggression can be understood as displays designed by natural selection to enhance signals of physical strength and fighting ability.

Panel 5: Domestic Violence, with Emphasis on Spousal/Partner Relationships

An evolutionary perspective on family violence

John Archer

School of Psychology, University of Central Lancashire,

The aim of this presentation is to evaluate the application of evolutionary principles to the understanding of family violence. The following relevant evolutionary principles will be outlined: kinship and inclusive fitness; paternity uncertainty and mate guarding; reproductive value; parent-offspring conflict; resource holding power. The motivational mechanisms underlying these principles are then discussed, specifically discriminative parental solicitude and kin resemblance. The following forms of family violence are presented in the light of these principles and mechanisms, with relevant empirical research: (1) parental violence to unrelated children; (2) parental violence to biological children; (3) offspring's violence to parents; (4) violence between siblings. Violence between sexual partners is considered in relation to (1) conflicts of interest and power relations between males and females; (2) spousal abuse as mate guarding; (3) male sexual jealousy as a mediator of partner violence; (4) reproductive value. It is concluded that an evolutionary approach has a number of strengths in terms of providing a comprehensive theoretical framework and specific principles underlying many aspects of family violence, although the current emphasis on male mate guarding is too narrow to explain current findings in relation to partner violence.

Men's Proprietary View of Their Romantic Partners is Specific to Sexuality:

An Experimental Study

Aaron T. Goetz

California State University, Fullerton

Even across disciplines and theoretical perspectives, most agree that men take a proprietary view of their romantic partners; men view their partners as an entity that they privately own and control. Disagreement, however, arises over the extent of this proprietary view. Some theorists have argued that men attempt to control and dominate all aspects of their partners' lives, while others—particularly those taking an evolutionary approach—have argued that men's proprietary view of their romantic partners is specific

to sexuality. Here, I describe the results of a recent experimental study in which I demonstrated that men are less likely to tolerate their partner's participation in activities that more likely to lead the opportunity for infidelity and that men become more tolerant of their partner's participation as the activities become less related to the opportunity for infidelity. These results suggest that men afford their partners many freedoms with the exception of those related to their sexual behavior. Discussion addresses how the adaptive problem of paternity uncertainty plays a central role in intimate partner violence.

Hurting the ones we love: The features and functions of aggressive punishment in close relationships

Julie Fitness

Macquarie University,

Human beings are born with a fundamental need for attachment, intimacy, and the love and esteem of valued others. Close relationships, then, are the source of our most intense positive emotions, including love and joy. However, close relationships are also the source of intense pain and anger when relationship partners reject or hurt one another, or fail to meet one another's needs, desires, or expectations. Further, the experience of emotional pain may generate a powerful impulse to punish, or inflict pain upon, the person who appears to have caused the distress. In this paper I will argue that the urge to retaliate in response to partner-triggered emotional pain is, to an extent, hard-wired and serves a variety of potentially adaptive functions, though it may also have destructive and tragic consequences. Following a discussion of the features and functions of punishment in close relationship contexts from an evolutionary, social-psychological perspective, I will discuss the roles of emotional pain and punishment as it relates to domestic violence. I will then present the findings of an empirical study of aggressive punishment in marriage and suggest some implications of this work for both enhancing our understanding of aggression in close relationships, and preventing its occurrence.

Panel 6: Further Discussion of Domestic Violence, with Emphasis on Parent-Child Relationships

Violence against Stepchildren. The Evidence and its Discontents.

Martin Daly and Margo Wilson

Department of Psychology, McMaster University

Parental investment is costly and evolves to be allocated where it is most likely to promote parental fitness. While it is implausible that abusing or killing stepchildren would have promoted the assailants' fitness in ancestral human social environments, a general preference for their own offspring surely would have. Elevated risks to stepchildren are a likely byproduct of such discriminative parental solicitude.

It is now almost 30 years since we first demonstrated that children living with one genetic parent and one stepparent were indeed mistreated more than children in intact birth families. Further research has shown that such "Cinderella effects" are widespread, perhaps even universal, are often

substantial, and cannot be explained away as artifacts of any correlated factor yet suggested.

The disproportionate victimization of stepchildren is now the most extensively documented generalization in the family violence literature, raising further questions, such as what explains variability in risk differentials between maltreatment types and locales, and whether the individual-level predictors of abuse are the same for genetic and stepparents. Unfortunately, progress on these important issues has been hindered by a relentless distraction: the manufacture of "controversy" about whether Cinderella effects exist at all. A motivation for this nay-saying appears to be antipathy to the Darwinian worldview and/or to its application to *Homo sapiens*.

Hormonal responses to domestic violence

Mark Flinn

University of Missouri, Columbia

Exposure to stressful experiences increases vulnerability to adverse health outcomes. A potential endocrine mechanism mediating the link between stress and health is the hypothalamic-pituitary-adrenal (HPA) system, with a key role attributed to the glucocorticoid hormone cortisol. Retrospective clinical studies indicate that traumatic experiences during childhood such as exposure to domestic violence can have a permanent influence on HPA regulation. Here I present analyses of naturalistic, longitudinal data on cortisol levels, social stressors including domestic violence, and health among children to assess developmental trajectories of HPA functioning. Saliva samples (N=32,219) were collected and assayed for cortisol in concert with monitoring of growth, morbidity, and social environment for children (N=317) in a rural Dominican community each year over a 20-year period (1988-2008). Several measures of individual cortisol (C) profiles are analyzed: (1) average C, (2) average wake-up C, (3) average ratio of AM/PM C, (4) variability of AM and PM C, and (5) reactivity of C in response to stressors. A majority of children exhibit moderate stability of all five measures over multiple year periods. Children exposed to domestic violence exhibit significant changes in some of these measures. Changes in HPA response, however, appear to be context-specific, with increased reactivity to some types of social stressors, but normal or reduced reactivity to physical stressors.