

Symposia

Evolutionary Foundations of Human Hypersociality

Peter LaFreniere

These four papers examine possible evolutionary foundations for human hypersociality, as well as the plausibility of a hierarchy of levels of natural selection that includes group selection as a significant force in shaping emotional, motivational, and social control mechanisms in ways that may sometimes compromise individual fitness.

Thinking of a society as like a single organism dates back to Aristotle and was scientifically respectable until the middle of the 20th century, when it was eclipsed by methodological individualism in the social sciences and the theory of individual selection in biology. Wilson surveys recent developments in evolutionary biology that have led to the revival of the organismic view of society and some of the implications for the study of humans. He concludes that human social groups are likely to be at least partially organismic even when their members are genetically unrelated to each other.

MacDonald's discusses the resolution of the "free rider" problem in human groups via mechanisms of social control that range from subtle effects of group pressure on modes of dress to laws that result in large penalties to violators. Under conditions of powerful community controls that prescribe behavior in a wide range of settings, populations become group-structured and between-group selection occurs. Social identity mechanisms are thus an early-developing human universal resulting in in-group cohesiveness under conditions of between-group competition.

LaFreniere explores the likelihood that multiple levels of selection, including group selection, have provided an important evolutionary foundation for emotions necessary to hypersociality in human groups. Primate emotions play a central role in maintaining group cohesion and humans have evolved additional emotional capacities that refine and extend the mechanisms responsible for cohesion within much larger ethnic, cultural, linguistic and national groups. The adaptive functions of pride, shame, guilt, and blushing are uniquely important to large group cohesion by promoting conformity to culturally prescribed social norms.

Sanderson argues that the only form of group selection that can logically exist is one in which the members of a group are the recipients of benefits that result from individual-level adaptations. He equates the problem with group selection in evolutionary biology with functionalist modes of theorizing within sociology and anthropology: they both reify the group by treating it as an entity that somehow exists apart from its individual members. In his view, group selection theorists have fallen into a logical trap by failing to distinguish (a) behavior that evolves because it benefits the group, and (b) behavior that has the consequence of benefiting the group.

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SOCIETY AS ORGANISM: NEW LIFE FOR AN OLD CONCEPT

Thinking of a society as like a single organism dates back to Aristotle and was scientifically respectable until the middle of the 20th century, when it was eclipsed by methodological individualism in the social sciences and the theory of individual selection in biology. Recent developments in evolutionary biology have made the idea respectable again. Not only can societies be like single organisms, but single organisms are literally the societies of past ages, whose members have become so integrated that we see the whole more than the parts. Human social groups are likely to be at least partially organismic even when their members are genetically unrelated to each other. I will survey the developments in evolutionary biology that led to the revival of the organismic view of society and some of the implications for the study of humans.

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SOCIAL AND PSYCHOLOGICAL MECHANISMS OF GROUP COHESION

Human groups are able to solve the free rider problem by mechanisms of social control. Social controls can range from subtle effects of group pressure on modes of dress to laws or social practices that result in large penalties to violators. Human groups have sometimes been characterized by powerful

community controls that minutely prescribed behavior in a wide range of settings, including modes of dressing, religious observance, business practices, and the type and extent of contact with outgroup members. Under these conditions, populations become group-structured and between-group selection occurs. There is also evidence for the importance of between-group selection at the psychological level. Social identity mechanisms are an early-developing human universal resulting in ingroup cohesiveness under conditions of between-group competition. There are also individual differences and cross-cultural differences in the extent to which people identify with groups, as indicated by work on the individualism-collectivism dimension. Finally, recent experimental work on public goods situations also indicates that altruistic punishment of free-riders occurs among groups of strangers, suggesting that natural selection has operated to shape group behavior in ways likely to compromise individual fitness.

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THE ROLE OF HUMAN EMOTIONS IN PROMOTING LARGE GROUP COHESION

Primate emotions play a central role in maintaining group cohesion and humans have evolved additional emotional capacities that refine and extend the mechanisms responsible for cohesion within much larger societies. Traditional Darwinian accounts emphasize the dual functions of internal regulation and social communication for a number of discrete, basic emotions. In addition, the adaptive functions of a range of self-conscious emotions, including pride, shame, and guilt are uniquely important to human group cohesion by motivating the individual to conform to culturally prescribed social norms. Moreover, the uniquely human universal of involuntary blushing appears to contradict the view that signals evolve solely to manipulate receiver's behavior, rather than as expressions that can somehow be used by receiver to access sender's (true) internal state. In this paper I explore the likelihood that multiple levels of selection, including group selection, have provided important evolutionary foundations for the hypersociality that characterizes human groups.

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THOSE WHO ADVOCATE GROUP SELECTION REIFY THE GROUP

The problem with group selection in evolutionary biology and its social-scientific descendants is the same as the problem with functionalist modes of theorizing within sociology and anthropology: it reifies the group by treating it as a Durkheimian *sui generis* — as an entity that somehow exists apart from its individual members. This is a logical error. In their recent book *Unto Others* (1998), Sober and Wilson illustrate group selection by pointing to the greater success of the Nuer in their rivalry with the Dinka. They claim that the Nuer replaced the Dinka because they were better organized at the group level. Rather than pointing to the necessity of invoking group selection mechanisms, in my view the only thing this example shows is that Nuer individuals had greater insight into how the group could be used for individual advantage, and that they were better at postponing gratification. Sober and Wilson have fallen into a logical trap. They fail to make the critical distinction between (a) behavior that evolves because it benefits the group, and (b) behavior that has the consequence of benefitting the group. The examples they give involve the latter, not the former. The only form of group selection that can logically exist is one in which the members of a group are the recipients of benefits that result from individual-level adaptations. However, I see no compelling reason to call this group selection.

Kimbrough Oller

INFANT VOCALIZATION AND HUMAN EVOLUTION

The study of interaction between parents and infants has produced a wide variety of new results that shed light on how humans may have evolved and how vocalization may have played a significant role in hominid survival. Both differences and similarities between human and non-human primate vocalizations offer perspectives on socialization and the ways that infants elicit care and parents participate in selection based in part on the nature of vocalizations. Both the developmental perspective (which has grown rapidly in the past two decades) and the comparative perspective, especially with other primates (which is also growing

fast), offer new suggestions about the way hominid evolution may have proceeded. Kathleen Bloom will synthesize results from 30 years of research in her laboratories, research that has shed considerable light on contingencies in vocalization between parents and infants. She will emphasize new work related to a role for nasal resonance in parent-infant interaction and its evolutionary implications. John L. Locke has been a major contributor to infant vocalizations, child language and neurolinguistics for decades. His paper will synthesize information about how parental selection of infants appears to be based upon the social well-being of the infant as indicated in part by the quality of vocalization, especially the cry. D. Kimbrough Oller will bring perspectives based on five longitudinal studies of human infant vocalization in presenting a taxonomy of functions that human infant vocalizations serve and a discussion of how they may contribute to survival based upon various strands of empirical evidence.

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THE ETHOLOGICAL SIGNIFICANCE OF NASAL RESONANCE IN INFANT PREVERBAL VOCALIZATION

Imbedded in the seemingly meaningless cooing sounds of preverbal infants are clues to the structure and function of human conversation. Based on empirical data, it will be shown that by 3-months of age infants adjust the acoustic quality of their vocalizations in response to "conversational" turn-taking, and that the nasal resonance of their vocalizations has significant impact on vocal play with adults. Evidence will be provided for a link between nasal resonance (timbre) of speakers' voices and emotional reactions of listeners, across the lifespan. The possible evolutionary and social significance of resonance of voice will be considered.

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PARENTAL SELECTION IN THE EVOLUTION OF VOCAL CAPACITY

The present paper proposes a parental role in evolution of vocal capacity. Survival of the human infant depends on parental care, which is commonly abdicated in circumstances involving atypical cries and sensory disorders. Along with deformity and illness, such conditions often correlate with neglect and even infanticide. Inconsolable crying is the primary reason for aggression toward children under the age of two years. Children who happen to be limited in their ability to acquire language are at unusual risk of maltreatment. These facts, along with infanticide among nonhuman primates, support a parental selection hypothesis for spoken language.

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FUNCTIONS OF HUMAN INFANT VOCALIZATION: NATURAL SELECTION AND SURVIVABILITY

Prior speculation about 'randomness' in babbling notwithstanding, empirical evidence and evolutionary theory suggest that human infant vocalization is highly structured, and is guided by socially and developmentally significant functions that enhance survivability of infants who develop in accord with a canalized pattern. The paper presents a taxonomy of functions that are logically possible for infant sounds to serve and reviews relevant evidence. It is reasoned that these functions must have played significant roles throughout hominid evolution since survival advantages to vocal play were needed to counterbalance the danger that such vocalization might attract predators.

Peter Corning

Discussant: Frank Salter

THE ORIGIN OF WAR

Accumulating research across a spectrum of disciplines, from anthropology to ethology, primatology and political science, lend strong support to the thesis that collective violence is a widespread phenomenon in the natural world -- an adaptive instrumentality with many uses. This is true of the human species as well. There is reason to believe that collective violence has also played an important part in human evolution and that organized modern "warfare" represents a cultural elaboration upon a deep-seated part of the hominid behavioral repertoire.

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SYNERGY GOES TO WAR: AN EVOLUTIONARY THEORY OF COLLECTIVE VIOLENCE

Synergy — otherwise unattainable combined effects that are produced by two or more elements, parts or individuals — has played a key causal role in the evolution of complexity, from the very origins of life to the evolution of humankind and complex societies. This theory — known as the "Synergism Hypothesis" — also applies to social behavior, including the use of collective violence for various purposes: predation, defense against predators, the acquisition of needed resources, and the defense of these resources against other groups and species. Among other things, there have been (1) synergies of scale, (2) cost and risk sharing, (3) a division of labor (or, better said, a "combination of labor"), (4) functional complementarities, (5) information sharing and collective "intelligence" and (6) tool and technology "symbioses". More important, the incidence of collective violence — in nature and human societies alike — is greatly influenced by synergies of various kinds, which shape the "bioeconomic" benefits, costs and risks. Synergy is a necessary (but not sufficient) causal agency. Though there are notable exceptions (and some significant qualifiers), collective violence is, by and large, an evolved, synergy-driven instrumentality in humankind, not a mindless instinct or a reproductive strategy run amok. The thesis that various forms of collective violence were of vital importance in human evolution and are not a recent, "historical" invention will also be briefly reviewed.

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THE ORIGINS OF WAR: THE EVOLUTION OF INTERGROUP VIOLENCE IN ANIMALS AND MAN

The main thesis of my book "The Origin of War: The Evolution of a Male-Coalitional Reproductive Strategy" (Groningen: Origin Press, 1995) is that warfare (violent intergroup interaction) was not, as the standard opinion is, a cultural invention concomitant with the agricultural revolution and pristine state formation in Mesopotamia some five thousand years ago, but an evolved high-risk/high-gain male-coalitional, parental-investment strategy of a hypersocial, large-brained, highly cooperative, and slightly ethnocentric, primate. Warring behavior ('lethal male raiding') is confined to typically highly social and 'brainy' species, cognitively capable of establishing relatively long-term polyadic coalitions, mainly Hominidae and Panidae. This, at least partially, explains why males are universally the warriors, why warfare emerged so (relatively) late in evolution, and why it is so conspicuously absent in mammals generally. In evolutionary perspective, the main problem I addressed in this study was to explain why war or its nonhuman equivalent (violent and more or less organized intergroup conflict) is confined in the animal kingdom to the hominids/humans, at least one species of chimpanzee ('Pan troglodytes'), and, though in much lesser and milder degree and more or less orchestrated ('pitched battle'), in some dolphins, social carnivores (such as hyenas), and a number of primates, such as colobines, baboons and macaques. The paper will focus on the evolution of intergroup agonistic behavior, especially the roles of sexual selection and kin selection.

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WARFARE IN SOCIAL EVOLUTION: A LOOK AT ITS EVOLUTIONARY UNDERPINNINGS

Numerous theorists agree that warfare was a major factor in social evolution. However, from an evolutionary point of view the question arises why individuals should be willing to risk their lives in war? It is suggested that inclusive fitness theory may account for part of the problem by pointing to the potential reproductive benefits for partaking individuals. However, with regard to warfare's impact on social evolution, kin ties could not have been the only foundations for warriors' cooperation. It will be pointed out how the introduction of new patterns of cooperation, as well as of other innovations exerted a major impact on social evolution.

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AGGRESSION AND WARFARE

Aggression is a topic still much disputed as to definition and causation. I deal here only with intraspecific aggression and discuss individual as well as collective aggression, and their phylogenetic roots. I begin with our dominance appetite, which does not only find its outlet in physical aggression. Collective aggression and defence has a phylogenetic background and is still universal in man, as there are the physiological reward mechanisms underlying them. I will point out the phenomena of fear of strangers, territoriality, and group identity. Many of the adaptations which bond groups tap into existing familial dispositions. This is particularly true for cultural adaptations able to bond groups so strongly that in competition with others, especially during warfare, they become units of selection. Natural selection thus becomes a process taking place on different levels.

WARFARE

Charlesworth, William

Discussant: Peter Meyer

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Profiling Terrorists: Ultimate and Proximate Causes of a Terroristic Act

A terroristic act, like any human behaviour, is a product of multiple interacting causal factors that consist of histories and situations of various lengths and intensities. These factors include genetic traits, environmental conditions, and early experiences that facilitate and sustain aggressive tendencies as well as situational stimulæ that trigger the act itself. It is hypothesized that a terroristic act has its genetic origins in evolutionary adaptations to respond aggressively to resource scarcity. However, whether an individual actually engages in the act or not is contingent upon a range of processes resulting from the interaction of genetic traits, life experiences, and proximate stimulus situations.

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EVOLUTIONARY ASPECTS OF GENDER ROLES IN WAR

Across a remarkable range of cultures and historical periods, in warfare males are the primary (usually the exclusive) fighters. The cross-cultural consistency of these gender roles in war suggests that their roots extend deep into human prehistory. This paper considers the empirical evidence relevant to evolutionary theories that claim to account for the gendering of war roles. It brings to bear on arguments about reproductive advantage—data about male-female size differentials, spatial skills, dominance hierarchies, and the behavioral aspects of testosterone. I conclude that the evolutionary pressures arising from resource competition were more important than those arising from breeding competition, in shaping gendered war roles. The paper fills a gap in my book *War and Gender*, which largely bypasses evolutionary theories in discussing the functional gender roles prominent in war through history and across cultures.

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ESTIMATING ETHNIC GENETIC INTERESTS

Biological theories of the origin of warfare and other types of altruism directed towards the tribe or ethnic group have often attributed this to some adaptive function, such as retention of group resources. However, no theory of altruism can be tested using Hamilton's rule for adaptive altruism without an estimate of the genetic interests at stake within the group (copies of a random member's genes carried in co-ethnics who are not kin). Though W. Hamilton's 1975 model showed that ethnic genetic interests could theoretically be large, no evolutionary theory has yet answered the most basic question, whether in fact that interest is ever large enough to make self-sacrifice in war adaptive. The genetic interests held by one population

in relation to another can be estimated from the mean kinship coefficient between the two populations, multiplied by population size. The genetic assay data needed to make this estimate for modern ethnic groups are becoming available, and yield results between one and six orders of magnitude larger than the genetic interests contained by families, depending on genetic distance and population size. Finer grained data are needed to estimate kinship coefficients between autochthonous tribes, but are likely to yield tribal genetic interests of the same order of magnitude as familial ones. The direction of theory and data strongly indicate that altruism directed towards one's ethnic group, such as self sacrifice in defence and contributions to other collective goods, can be adaptive.

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OLANE FATAN (HUNGRY FOR FIGHT) - Warfare among the Eipo and other Societies in New Guinea

In the course of 22 months fieldwork among the Eipo, members of the Mek group of cultures and languages in the Highlands of West-New Guinea, two ethnosemantically differentiated forms of armed conflict were documented: a) intragroup fighting (abala) and b) intergroup fighting (ise mal). Death rates were 1.5 person killed per 1,000 inhabitants per year in each form of fighting; approximately 1/4 of all men died a violent death. In some other highland societies the respective overall death rates reach 10/1,000/year. These Papuan societies, therefore, pay a very high toll for their martially oriented culture and the principle of revenge, which usually leads to a spiral of violence, especially as there is no institutionalized third party which could take care of the conflict through mediation. The fact that people are killed in intragroup fights is mostly regretted, the killing of an enemy in warfare is met with triumph. Warfare involves propaganda, mainly through dehumanizing the enemies. Aggression, therefore, may be one of the factors which have led to the extreme degree of cultural pseudospeciation so typical for Melanesian societies.

THE ARTS: BEYOND SEXUAL SELECTION

Nancy Aiken

If art is to be validated as an evolved human behavior, the adaptive function or functions, which are assumed, must be identified. Evolutionary psychologists follow Darwin in assuming that art evolved for purposes of sexual selection; that is, to help individuals, males in particular, attract mates. While it appears to be true that males (and even females) decorate themselves (and write sonnets, sing love songs, and show their etchings) when attempting to attract mates, cross-cultural archaeological findings and the characteristics of art suggest that much more than mate choice has been involved in the evolution of art behavior. For example, M. Sugiyama has offered evidence that story-telling in hunter-gatherer societies imparts information necessary to survival. N. Aiken has suggested that art can manipulate thought and behavior and, thus, can be used to benefit art makers or those controlling the art making. E. Dissanayake has argued that the arts help to reduce anxiety or stress and serve group unification which benefits the interests of individuals in the group. K. Coe has argued that the aim of art in ancestral environments was to identify kin and co-descendants and encourage cooperation among those so identified. While discussants agree that art can be used to attract sexual partners, they also agree that it serves other adaptive functions. The papers will offer alternatives to sexual selection as adaptive functions of art.

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DO THE VISUAL ARTS OF AFRICA SUPPORT MILLER'S THESIS ABOUT FEMALE CHOICE?

Geoffrey F. Miller contends that paintings serve as fitness indicators for the artists who painted them. Just as the bower serves as the means for female bowerbird choice of mate, paintings (visual art) serve as male display for female choice. Sexual selection theory would predict, given this thesis, that men are the artists just as only male bowerbirds build bowers. Also, since the purpose of visual art, like the bowers, are for male display, women should choose husbands based on visual art competitions. A survey of the visual arts of Africa for nearly every ethnic tradition on the continent was made in order to test this thesis.

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WHAT SEXUAL SELECTION CANNOT EXPLAIN: TRADITIONAL VISUAL ART AND ANCESTORS

Here I point out the characteristics of visual art that are inconsistent with predictions made using sexual selection theory. The majority of visual art has been traditional and characterized by its mode of inheritance (one inherits the right to learn and use certain art) and persistence, often across hundreds and even thousands of years. As an inherited trait, art identifies co-descendants (who inherited it from a common ancestor) and calls attention to obligations associated with common ancestry. I discuss an alternative explanation for art, taking into consideration individual selection and selfish genes as well as parent-child conflict.

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ART'S ROLE IN EDUCATION

Strabo in the first century AD, described a Scythian initiation rite in which young males would dress in costumes representing wolves and dance in forest clearings. After competing their initiation, not only were these males regarded as being educated about their own ancestors, who were powerful like the wolves, but they now saw outsiders as wolves' prey. The ritual and its art played a crucial role in educating young males about their social role and their ancestry and provided a means to distinguish insiders from outsiders. In this presentation, I will outline the dramatic and powerful role that art has played through much of human evolution in education of the young. I end my presentation by discussing methods for incorporating art in more contemporary educational settings.

DARWINIAN LITERARY ANALYSIS

Jonathan Gottschall

Over the last several decades human ethologists, and scholars from related fields, have proposed and tested proximate and ultimate theories of human behavior and psychology with impressive explanatory power. These theories have often been controversial, and literary scholars have often fought in the vanguard against their allegedly deterministic, imperialistic, and dehumanizing influence. In recent years, however, significant numbers of scholars from inside and outside the humanities have begun to take seriously the notion of a Darwinian literary analysis. These scholars are convinced that ethology and literary analysis have much to gain from one another, and that throwing artificial barriers between the two senselessly impoverishes them both.

The literary narratives examined in this symposium are diverse, spanning genres, cultures, continents, languages and centuries: from folk narratives (Allen), to heroic epics (Gottschall), to 19th century British novels (Carroll and Jobling). Yet the authors arrive at related conclusions: analyzing narratives with the tools of human ethology and related Darwinian approaches yields fresh and revealing perspectives on the motives and behaviors of characters, the dramatic persistence of universal literary themes, and the ultimate purposes of storytelling. In short, all papers in this symposium are based on the conviction that humans are storytelling animals, that we have been shaped by natural selection to pursue goals conducive to survival and reproduction, and that these facts are reflected in our literary products. In order to fully appreciate literature – its characters, plots, themes, and purposes – we must fully appreciate this.

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RITUAL COMBAT IN HOMER'S *ILIAD*

Ethologists contend that within-group competition is typically marked by restraining rituals while between-group competition, lacking such restraining rituals, is more likely to escalate to the lethal level. Such a dynamic is apparent in Homer's epics, especially the *Iliad*. Competition within the two armies fighting on

the Trojan plain is intense, unremitting, and often physical, but it is governed by salient rules and rituals that strictly proscribe serious violence. Competition between members of opposing armies, while retaining some ritualistic elements, is basically unrestrained and escalation to the lethal level is very common. This paper focuses mainly on the ritualistic elements of intra-Trojan and intra-Greek verbal and physical competition, demonstrating that the proximate and ultimate goals of ritual combat in Homeric society are the same as the goals of ritual combat among animals: respectively, social dominance and increased access to somatic and reproductive resources.

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TELLIN THE TALES AND TEACHING THE TRADITIONS: DENE ORAL NARRATIVES AND THE UNIVERSAL THEMES OF ETHNOCENTRISM, XENOPHOBIA, AND NEOPHILLIA

Oral narratives have been employed as educational devices by traditional indigenous peoples the world over for millennia. Such narratives have been traditionally used by indigenous elders to educate and enculturate their children into membership within local in-groups. Embedded in these narratives are universal themes that embody an innate need to reconcile ambivalence between cooperating and competing with members of the in-group and those of an out-group. This ubiquitous process can be observed in the last extant traditional indigenous cultures in the world today. Narratives that embody this universal ambivalence and its reconciliation likely have their origin in our evolutionary past. This is to say, they are rooted in our evolved psychology because we spent 99.9% of our evolutionary history in band and tribal-level societies that were characterized by the need to reconcile the ethnocentrism and xenophobia of in-group members with out-group cooperation. The following presentation focuses on statistical thematic data obtained in the analysis of 71 oral narratives collected among Dene Athabascans in the Northwest Territories, Canada in the winter of 1993-94, along with a brief illustrated slide presentation and discussion of one such teaching narrative.

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INCLUSIVE FITNESS AND POINT OF VIEW IN VICTORIAN FICTION

The modern theory of inclusive fitness is simple, elegant, and powerful. Literary depictions are complex efforts to evoke the often messy and ambiguous qualities of subjective experience. The central challenge for a Darwinian literary criticism is to link the elementary principles of inclusive fitness with the qualitative complexity of literary representation. In this paper, I shall take Victorian fiction as a test case for this challenge. Can the total meaning structures of Victorian novels—both their large structural features and their most minute aesthetic and stylistic features—be reduced to the elementary principles of inclusive fitness? I think they can. I shall argue that the distinctive behavioral and motivational systems of human beings includes the production of successful offspring, and that this one large motive constitutes the single most important principle for the organization of Victorian narratives.

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FAULTLESS MONSTERS: POSITIVE BIASES IN SELF-PERCEPTION AND THE HERO IN THE NINETEENTH CENTURY BRITISH NOVEL

Many evolutionary psychologists have argued that positive biases in self-perception, such as the self-serving bias, the illusion of control, and the false uniqueness effect, are innate psychological mechanisms that produce adaptive benefits like high self-esteem, happiness, and attractiveness to coalitional partners. In a recent article in *Human Nature*, I argued that heroic narratives were universally popular because they fostered these biases in their audiences through audience members' identification with the hero. In this presentation, using the character of Henry Morton from Scott's *Old Mortality* as my primary example, I will extend my theory to the bourgeois hero of the nineteenth century British novel.

Development and Pathology of "Theory of mind" in evolutionary Perspective

Martin Brüne

Since Premack and Woodruff's (1978) seminal paper on "theory of mind" in non-human primates, this issue has been addressed in numerous studies by developmental psychologists, primate researchers, and from a psychopathological perspective. The capacity to infer what other individuals are thinking, believing, and pretending, without necessarily relying on behavioural cues, commonly referred to as having a "theory of mind", evolved during primate evolution, probably related to the complexity of social interactions. From a sociobiological perspective, "theory of mind" may be related to the problem of "reciprocal altruism" and, therefore, in part to the necessity of cheating detection.

Human beings are specialised on "mind-reading" in such an extraordinary way that some disruptions and hyperfunctions of the "theory of mind mechanism" may be viewed as trade-offs of this evolved capacity. Whereas some people, for instance, persons with autistic disorders, are severely compromised in their capacity to "mind-read", others, e.g., individuals with delusional disorders, over-attribute intentions and dispositions to others in situations where no such intentions exist. Somewhat in between lies the universal capacity of human societies to create religious belief systems, suggesting an additional "exaptational" function of mental state attribution.

The present symposium highlights various aspects of "theory of mind" with respect to primate social intelligence, children's acquisition of "theory of mind" capacities, cross-cultural evidence for the universality of social inference mechanisms, and psychopathological correlates.

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Social Intelligence, Theory of mind, and Psychopathology

In the late 1970s, when Nicholas Humphrey suggested that primates have a "surplus" intelligence which exceeds the cognitive demands of their routine actions, and David Premack and Guy Woodruff asked whether the chimpanzee has a "theory of mind", a new research domain emerged that now impinges on comparative cognitive psychology, developmental psychology, and psychopathology. There is now good empirical evidence that the capacity to infer mental states of others evolved gradually in hominoids, and follows distinct developmental steps in human infants. Likewise, it is widely accepted that in autistic spectrum disorder theory of mind acquisition is severely delayed or remains incomplete. The present paper deals with the question as to whether theory of mind is impaired in other psychiatric disorders, and how to assess such deficits systematically.

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Enphronesis among Trobriand highschool students, Papua New Guinea

It has been argued that the faculty for theory of mind/mentalizing, for which I suggest the term enphronesis (cp. empathy), arose as a consequence of socially interacting individuals employing complex, partially hidden strategies, the decoding of which was highly advantageous.

The Trobriand Islanders have a complex hierarchical society, into which

a number of competitive elements are embedded. The best known of them is kula, a complicated system of long distance exchange of valuables. It requires a very good memory and understanding of past, partly historic and recent events, highly developed social skills and the ability to foresee the strategic moves of partners and competitors. Trobriand Islanders themselves state that "If you want to have success in kula you must be able to trick others".

We carried out (with the help of Katja Boedeker and Bogdan Croitoru) a cartoon-type test, which involved several stages of false belief among 14-17 year old highschool students in Losuia, the administrative center of the Trobriand Islands. Results will be shown. Not all students were able to correctly interpret the picture story, whereas children in Western-type societies usually don't have problems with these kinds of

tasks. The question remains open whether this surprising outcome is due to a less developed ability for enphronesis or rather caused by a test which was not adapted well enough to the cultural background of the test persons.

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Borderline Personality Disorder and Mentalizing Capacity: An Evolutionary View

The mental functioning of patients suffering from Borderline Personality Disorder (BPD) is characterised by disintegrated representations of self-with-others, emotional dysregulation, and serious deficits in self-reflective and metacognitive capacities. The term "metacognition" not only covers the capacity to think about one's own thoughts, but also mental abilities that have been labelled "mentalization", "reflective awareness", "theory of mind", and so on. Secure attachment during infancy forms the developmental basis of the acquisition of mentalizing capacities; the caregiver's capacity to mentalize may foster the child's bonding; abuse or neglect may undermine the acquisition of mentalizing capacities; symptoms of borderline personality disorder may arise as a consequence of inhibited mentalizing; psychotherapeutic work with these patients may facilitate the reactivation of this inhibited capacity. The therapist's mentalistic, elaborative "stance" enable the patient to reflect on himself as a thinking, feeling being. Adaptive and maladaptive aspects of disturbances of mentalizing in persons with severe personality disorders will be discussed in an evolutionary psychological and human ethological perspective.

TALKS

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USING SYSTEMATIC ETHOLOGICAL OBSERVATIONS TO STUDY RIOTS

The methodological difficulties involved in obtaining reliable and useful data concerning instances of collective violence using traditional social science methods are formidable. Most studies on the eruption and escalation of collective violence occur after the event has taken place. Investigators tend to focus on high profile events and rely almost exclusively on retrospective reports in which there are numerous conscious and unconscious distortions. When present investigators often stand at a distance because of their own safety. In this paper, I intend to show that ethological methods involving systematic and structured observations can be fruitfully applied to the study of the eruptions and escalation of collective violence.

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COMPOSITE FACES, ETHOLOGICAL THEORY, AND THE ATTRACTIVENESS OF AVERAGE FACES

In recent years, Langlois and others have argued that "attractive faces are only average" (the AFAA hypothesis; Langlois & Roggman, 1990). This hypothesis has provoked considerable discussion and controversy, and generated a number of empirical studies. This paper argues that both data and evolutionary theory provide a compelling case for the view that an average(d) face will be attractive. Nonetheless, ethological perspectives on physical attractiveness suggest that optimal facial attractiveness entails some supranormal facial features. Other challenges to the AFAA hypothesis are reviewed, including the fact that the composite techniques used to create "average" faces may inadvertently create some supranormal features.

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Conflict Resolution

Plenary

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Childhood begets children: human reproductive success then and now

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FLUCTUATING ASYMMETRY AND ROMANTIC JEALOUSY

Is fluctuating asymmetry (FA) related to the expression of romantic jealousy? The mate retention hypothesis for romantic jealousy suggests that individuals express jealousy to prevent philandering. Absolute mate value (i.e. one's mate value in a population) may be a factor predisposing individuals to romantic jealousy. FA was used as a measure of absolute mate value. Findings indicate that asymmetrical individuals are significantly more jealous in mating contexts. As predicted there was no relationship between FA and non-romantic jealousy. This finding is consistent with the evolutionary hypothesis that absolute mate value impacts the expression of jealousy emotions for mate retention purposes.

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Ethological analysis of begging in modern urban society

In this paper we are presenting the final results of our study of the begging behaviour in Moscow, Munich, Prague and Bucharest. Certain universal (a stretched hand; a depressed face with eyes down; written request for help) as well as cultural-specific strategies (begging with a pet; blessing; begging with a child; begging in military clothes) were found. Besides, in each country begging style was different in different ethnic groups of beggars: Russians, Czech or Romanian beggars were mainly begging on the same place, sitting or standing. Gypsy beggars (Romanian, Ukrainian and Middle Asian) were frequently walking along main streets and actively interact with people (personal address, touching). Beggars actively compete for most successful places (tourist places, metro stations, churches in the days of religious holidays being the most attractive for them). Some beggars were organised in small groups and cooperate with each other (mainly those, arrived to the city from other places (Moldavians, Ukrainians, Tajiks, Gypsy). Begging success (frequency of donations) was closely connected with the place of begging, begging style, beggars age, sex and physical status. Ethnic origin was among the most important determinant of beggars success, other factors equal, beggars belonging to the local ethnic majority were the most successful. Data on beggars-givers interactions are interpreted in the light of two theories: 1. the theory of reciprocal altruism (donations to: grandfathers and grandmothers; former soldiers; to people begging in front of churches, etc.); 2. the theory of ethnic nepotism (prevailing donations towards members of the same ethnic group).

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PROCESSES UNDERLYING SEX DIFFERENCES IN ROUTE-LEARNING STRATEGIES IN CHILDREN AND ADOLESCENTS

Cognitive processes underlying sex differences in route-learning strategies were investigated in children and adolescents using a direction-giving paradigm based on a novel map. Sex differences in specific

cognitive tasks emerged earlier in development than those found in route-learning strategies. This was followed by sex-specific patterns of cognitive processes underlying route-learning strategies in adolescents, suggesting that route-learning strategies emanate from different spatial processes. Results are consistent with the notion of specialized spatial processes in males and females, presumed to be the products of differential evolutionary pressures related to the division of labor.

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Physical and behavioural masculinity as correlates of male reproductive success

The role of testosterone-dependent behaviour and physique in male reproductive success was investigated in !Kung San hunter-gatherers. We found positive correlations of testosterone with the number of offspring and child survival as well as with more robust body build and physical aggression in our sample. Besides a direct testosterone action on fertility parameters indirect hormonal effects on body build and aggression could explain our findings.

However, in a second study, behavioural masculinity in a sample of male infertility patients from Hamburg was associated with very low sperm counts, defects in sperm morphology and motility, resulting in extremely low fertility rates.

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Visual and vocal attractiveness is related in women

We investigated the relationship between visual and vocal attractiveness in women. Voices were played from a tape to male judges who assessed the age and vocal attractiveness. They also assessed the attractiveness of photographs of the same women. Interestingly, facial and vocal attractiveness were correlated. Also, voices with higher fundamental frequencies (lowest frequency produced – a good indicator of age) were assessed as more attractive, and as belonging to younger women. Women with a high BMI had lower voices and women with smaller waist-to-hip ratios had 'rougher' voices. Therefore, in women, different measures of attractiveness signal similar qualities, such as female age and body size. In men visual and vocal attractiveness are not related (Collins 2000), indicating conflict between the two signals in men, but not women.

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RECOGNITION OF PARENTS, CHILDREN, AND SIBLINGS BY OLFACTION

Odor recognition may help mediate favorable treatment of biological children and siblings. Our previous research indicated that mothers could identify their biological children but not their stepchildren, and that children could identify their full siblings but not their half-siblings or stepsiblings. Research by others has yielded equivocal results about fathers' ability to identify their infant children by smell. In this study we are testing parents' recognition of and preference for the odors of their preadolescent children. We are also testing children's recognition of and preference for the odors of their parents and siblings.

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AN EVOLUTIONARY INVESTIGATION OF THE INFLUENCE OF MENSTRUAL PHASE ON FACIAL ATTRACTIVENESS JUDGEMENTS

This study examined the influence of menstrual phase on facial attractiveness judgements. We hypothesized that ovulating women are more discriminating when rating male attractiveness than women

in the follicular phase, due to conception probability. Female attractiveness ratings were also used to investigate same-sex competition. Participants (N=129) rated the faces during both phases. Phase was not significantly related to facial attractiveness judgements. However, female faces were rated significantly more attractive, and more variable, than male faces. These results do not support the existence of hormonal influences on facial attractiveness perception, but suggest that same-sex competition is more important than previously documented.

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UNIFICATION OF POWER & INTIMACY VIA R THEORY

Animal research has deployed resource holding potential (RHP) to index fighting capacity. Individuals assess their own and others' RHP. Price and I extended this to human conflict and cooperation by expanding RHP to a more inclusive R that also indexes value, power, allies and other components of personal "worth." Interpersonal R exchanges augment or decrease an audience's R in any human communication. Social psychological theory considers power and intimacy as separate (orthogonal) dimensions of relating. But invoking models of interpersonal R makes a unified approach possible. Data will illustrate this conclusion as well as the operation of interpersonal R oscillation.

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NON-verbal Communication in depressed patients' daily social interactions

Convergence of behaviour is the conversation partners' mutual adaptation of levels of their non-verbal behaviour towards a similar level (i.e. an interpersonal process). When analysed from clinical interviews with depressed patients, this process predicts the course of depression. We aim to extend these findings to the patients' daily social interactions. We analysed the interactions of 26 depressed patients with their spouse and with unfamiliar people (matched on the spouses). We investigated 1) whether convergence of behaviour occurs with respect to involvement behaviour and 2) whether this process in daily interactions also predicts the course of depression.

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THE YOUNG MALE SYNDROME AND THE COMMUNICATION OF RISK TAKING POTENTIAL

Young male sensation seeking and risk taking potential is a trait which could be communicated by human nonverbal behaviour in order to avoid conflicts with other males. In order to assess young males (n=255) readiness for risk-taking, we used Zuckerman's Sensation Seeking Scale Form V, and we used for the analysis of non-verbal behavior the method of "motion energy detection", a technique that is based on the acquisition and integration of physical parameters of movement. We then successfully trained artificial neural networks for the detection of the sensation seeking traits in 30 sec of filmed motion sequences.

Symptoms of sensation seeking known from literature were found in our sample: smokers and persons, who had consumed alcohol scored significantly higher on the sensation seeking scales than non-smokers and sober probands. Moreover we found hints that human sensation seeking could be influenced by mechanisms of mate choice.

Our study indicates that human male sensation seeking finds its expression in nonverbal behaviour and that artificial neural networks can be used to classify motion sequences for readiness for risk-taking.

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Maternal love and ambivalence in the Pleistocene, the 18th Century, and right now *Plenary*

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FACIAL ASYMMETRY AS A MARKER FOR FITNESS?

Asymmetry is often considered to be a marker for fitness of an organism. However, the empirical evidence in humans is scarce. We investigated the relation between direct fitness and facial asymmetry with respect to the sex of the offspring.

75 women with up to four children took place in the study. Fitness was measured as the number of children a woman got, the facial asymmetry was measured from photographs.

Main variables with an effect on the number of children (woman's age, her age of reproduction onset, duration of partnership, and wish for children) were partialled out.

The offspring's sex seems to be dependent on the woman's asymmetry: the more asymmetric a woman is, the more sons she gets ($r = .43^{**}$), the less asymmetric (i.e. the more symmetric) she is the more daughters ($r = -0.44^{**}$). Accordingly, there is no correlation between the overall number of children and the mother's asymmetry.

Results will be discussed with respect to reproductive strategies and the correlation of asymmetry and fitness.

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CROSS-CULTURAL ANALYSIS OF SOCIAL BEHAVIOR IN EARLY CHILDHOOD

A multi-national study using the Social Competence and Behavior Evaluation Inventory (SCBE-30) was conducted to investigate preschool children's social and emotional development across cultures. A total of 4640 children from eight participating countries, including Austria, Brazil, Canada, China, Italy, Japan, Russia, and the United States were evaluated by their preschool teachers. The main objective was to validate the SCBE-30 in each country and build a cross-cultural data set for the investigation of universals, as well as cultural differences, in the development of preschool children's social competence and the frequency and type of their behavioral problems. Results provide a clear case for the structural equivalence of the SCBE-30 across all samples, for universals in the structure of early social behavior, and possibly some differences that may be attributed to culture. The pattern of gender differences found in North American samples was found to generalize across cultural contexts as preschool boys were universally reported to be significantly more aggressive and viewed as less socially competent than girls. Age differences were also found in all eight samples reflecting increasing competence in older children, however age trends in the prevalence of behavior problems were culture specific.

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ANXIETY AND MENSTRUAL CYCLE PHASE ON 3-D SPATIAL PERFORMANCE

Anxiety influences on 3-D spatial performance were explored across menstrual cycle phases (menstrual vs. non-menstrual). 240 (menstrual or non-menstrual) females were randomly assigned to one of four anxiety groups (time, performance, both time and performance or control). An estrogen by anxiety interaction was found. Results indicated that the menstrual females performed better on the 3-D tests under time anxiety while the non-menstrual group performed best under performance anxiety. The menstrual female's spatial performance was comparable to a male population ($N=120$) under similar time anxiety. Results will be discussed from an evolutionary perspective.

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Do Parents Show Favoritism for their Symmetric Children?

In a previously published study (Mealey, Bridgstock & Townsend, 1999), we were able to demonstrate that among pairs of identical twins, the more symmetric twin was consistently rated as the more attractive, and that the magnitude of the difference in perceived attractiveness of co-twin pairs was directly related to the magnitude of difference in their symmetry. More recently, Mealey (2001) has suggested that study of monozygotic (but not truly "identical") twins might provide a new method for mapping experiential differences onto phenotypic differences and differences in life history strategy. As an initial attempt to use this methodology, we recontacted twins from the symmetry study and asked them to complete questionnaires about their perception of their parents' parenting style. We suspected that the more symmetric twin of a pair would likely have received preferential treatment by parents, and would thus report more favorable perceptions of their experience than would their less symmetric co-twin. We also tested the same prediction using the more standard methodology, by ignoring twinship status and correlating individuals' symmetry with individuals' perceptions of parental style.

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FRIENDS OR LOVERS? FORM AND FREQUENCY OF MUTUAL GROOMING

Both friends and lovers groom one another, but the form grooming takes differs according to the nature of the relationship. The four forms of grooming that appear include: traditional (shampooing, shaving, manicures), non-traditional (removing lint, hairs, food), mimicry (stroking, massaging), and neurotic (picking at scabs, pimples). Romantically involved couples engaged in more traditional grooming while friends engaged in more non-traditional grooming. It is proposed that the form of grooming exhibited by couples derives from evolved caregiving tendencies that demonstrate potential parental investment in the offspring the relationship may produce.

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THE ROLE OF SIMILARITY IN CHOOSING FRIENDS

Studies on friendship have shown that friends resemble each other in various ways. These findings lead to the question whether similarity emerges through frequent interaction or if it is relevant for establishing a new relationship.

50 female students who, after having recently moved to Vienna, were about to establish a new social network, were selected to take part in this study. They had to take photographs of all the new acquaintances they made and have them fill out a questionnaire.

We will answer the question whether similarities in physical appearance, socioeconomic background and personality traits support spontaneous sympathy or not.

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The rise of psychosocial problems, attachment and mismatch

Psychosocial problems in children and young people have increased in the last 50 years in the developed world despite reduction in the poverty with which these problems are often associated. At the same time the environment in which parents rear children has changed greatly from that of 50 years ago and from that of our Hunter Gatherer ancestors. One mechanism by which these changes could contribute to the rise in psychosocial problems is via attachment relationships, and at worst by promoting profoundly alienated young people. Social/therapeutic programmes which have improved parents' environment for parenting, and their children's outcome, have, without aiming to do that, usually moved that environment nearer in important aspects to that of Hunter Gatherers'.

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GENDER DIFFERENCES IN FACIAL ATTENTION AMONG CHILDREN IN COMPETITIVE CONTEXTS

Past research has demonstrated that females engaging in competitive behaviors receive more negative reactions than males engaging in competitive behaviors. The current research was designed to examine whether females would be more concerned about their competitors' reaction in a competitive context compared to males. Concern was measured by the degree of attention to others' faces. Forty groups of four same-sex children from kindergarten and fourth grade played two games. The games were designed to elicit both competitive and non-competitive behaviors. The results suggest that compared to males, females do pay more attention to other players' faces when competing.

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THE ETHOLOGICAL REQUIREMENTS OF A THEORY OF EMOTION

A scientific theory of emotion must specify the Nature of emotional behaviour and experience - i.e. What is the essential and distinctive character of the phenomena? and satisfy Ethology's four levels of explanation - 1. Causation. What is their essential and distinctive "cause"? 2. Function. What is their immediate effect or "purpose"? 3. Ontogeny. How do they develop in individuals? 4. Phylogeny. How have they evolved in humans? A summary of Thwarted Action State Signalling (TASS) theory meets these requirements. A survey of theories shows no others do this, perhaps because none is derived from emotional behaviour in animals.

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TWIN FILM ANALYSIS: JUDGEMENTS OF MZ AND DZ TWIN PAIRS IN ACTION

The present study examined judges' impressions of MZ (n = 34 pairs) and same-sex DZ (n = 12 pairs) twin children's behaviors during filmed puzzle completion. The twins' mean age was 8.65 years (SD = 1.42, 6.47 - 12.13). A multivariate mixed model analysis of variance with Helmert contrasts was used. MZ twins showed significantly higher cooperation than DZ twins across six relevant rating scales. However, significant differences were not found between MZ hand-concordant and MZ hand-d discordant pairs. Results from this approach support the view that individuals respond to, rather than create, twin group differences in social relations.

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CYCLE OF ADAPTATION DIFFERENCE, AMPLIFICATION AND PHYLOGENETIC EVOLUTION

The cycle of success, the process whereby success leads to more success, is part of normal growth and individuation. It raises inclusive fitness and is, therefore, a cycle of (proximal) adaptation. The cycle of adaptation can be observed in various behavioral systems such as the attachment, dominance, subordination and affiliative systems. One example is the circular relationship between a "secure" attachment and healthy affect regulation. Difference amplification is the process whereby genetic differences between two opponents in an agonistic encounter, that give one an advantage over the other, are magnified by the results of the encounter. It is attributable to the cycle of adaptation in the winner and the disruption of the cycle of adaptation in the loser. Assortative mating increased the effects of difference amplification. Difference amplification accelerated the rate of phylogenetic evolution in early man.

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Non-aleatory talk. Reduplicated syllables across languages

In verbal communication with babies many (all?) cultures utilize reduplications. They especially signify close kin (mother, father, siblings, grandparents etc.) and body functions. Results of a cross-language survey will be presented and conclusions will be drawn regarding psycholinguistics, developmental psychology and the formation of non-random lexemes.

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Salivary testosterone levels in healthy 90 years old Japanese males: Implications for endocrine senescence

Recent studies have shown significant interpopulation variation in ageing patterns of testosterone levels. We report a preliminary study comparing salivary testosterone (Tsal) in healthy 90 year old Japanese males (n = 26) with younger Japanese controls (n = 28; mean age 19). Elderly Tsal is significantly lower on average (90 yr 343.2 - 14.3 pmol/L; young 449.3 - 31.4; p < 0.01), suggesting age-related declines similar to other industrialized populations. However, individual values of 90 year old Japanese fall completely within the range of young group. Implications for age-specific reproductive-survival effort and individual heterogeneity regarding endocrine function are discussed.

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THE EVOLUTION OF SEX, DIFFERENTIAL REPRODUCTIVE STRATEGIES, AND THE 'BATTLE OF THE SEXES' REVISITED

Since the publication of my edited volume on sex differences and the battle of the sexes (J.M.G. van der Dennen [Ed.] "The Nature of the Sexes: The Sociobiology of Sex Differences and the 'Battle of the Sexes'", Groningen: Origin Press, 1992), fascinating new research and theorizing has opened novel perspectives on the evolution of sex (anisogamy and amphimixis), sexual selection, differential sexual (mating and reproductive) strategies, sex differences, parental imprinting and intragenomic conflicts, and the intricacies of the genetic, endocrine, and other sex-determining mechanisms. This paper reviews these recent developments and concludes that the battle of the sexes still rages from the molecular up to the interorganismic levels and beyond.

VAN SCHAİK, Carel

Orangutan tool use and the evolution of technology and intelligence

Plenary

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WHAT'S IMPORTANT-MARITAL SATISFACTION OR REPRODUCTIVE SUCCESS?

In the West, marriage is evaluated as a path to self-fulfillment for the married partners. In Eastern cultures, where the collective good is emphasized, marriage is evaluated in terms of advancing reproductive success or the broader societal good. In this theoretical paper, underlying cultural values (such as individualism vs. collectivism, broad socialization vs. narrow socialization) are identified, and their implications for evaluating marriage are discussed. Concepts are introduced from sociobiology, including

homogamy, reproductive fitness, kin altruism, sex differences in mate choice criteria, and discriminative parental solicitude. These evolutionary concepts may be seen as universally-recognized values cutting across differences in cultural norms and suggesting a new framework for evaluating marriage.

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MARRIAGE WITHIN THE EXTENDED FAMILY IN FOUR CULTURES

Children seem to lower marital satisfaction in Western countries but not in non-Western countries. Why would this decline occur after successful reproduction? This study shows that the number of children has a negative effect on spouses' love in Britain and the United States but has a neutral impact in China and Turkey. This study also examines complex family relationships in all four cultures, such as getting along with in-laws and living arrangements, and the effects of those variables on the married couple.

POSTERS

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THE SMELL OF FEAR

The aim of this study was to find out if humans – like other animals – use the olfactory pathway in order to inform their conspecifics of experienced fear and maybe warn them of possible dangers. In this study we tried to induce fear in women by showing them a terrifying video film. Fear was measured by Spielberger's State-Trait Anxiety Inventory and changes in subjects' cortisol levels. A "neutral" film was used as a control. The subjects wore axillary pads while they were watching the movies. In the second part of the experiment, these pads were presented to female raters in order to find out if they could tell a difference in the smell between the "neutral" and the "terrifying" film. Stress, as measured by cortisol, was not related to subjective fear nor to odour discrimination – thus subjects did not "smell" stress and discriminate fear – nonfear by stress alone.

Our results suggest that women are indeed able to detect "the smell of fear", and distinguish between "neutral" and "frightened" odour samples.

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TESTS OF A BEHAVIORAL ECOLOGICAL MODEL OF HUMAN DISPERSAL FROM THE NATAL FAMILY

For recent North American data I test predictions, derived from Emlen's behavioral ecological model of family formation, about the effects of natal territory quality (NTQ) on the timing of dispersal. Data are from the Panel Study of Income Dynamics, a longitudinal study of U.S. families. I chose specific NTQ and dispersal variables to facilitate comparison with Towner's (2001) study of dispersal in eighteenth century Massachusetts. Emlen's model predicts a negative linear relationship between NTQ (e.g., status) and willingness to disperse, while Towner found that individuals from middle-status families were less likely to disperse. I examine whether my dataset will support Emlen's prediction, parallel Towner's, or yield a third outcome.

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AN EVOLUTIONARY THEORY OF SCHIZOPHRENIA : CORTICAL CONNECTIVITY, METAREPRESENTATION AND THE SOCIAL BRAIN

Schizophrenia is a universal disorder with largely genetic aetiology. A theory is proposed that schizophrenia is a disorder of cortical and specifically fronto-temporal connectivity that evolved in association with emerging complex neural circuitry in human ancestors. These circuits evolved under selective pressures involving group living, and regulate aspects of social cognition such as metarepresentation and affective responsiveness. Evidence from various scientific fields suggests that the evolutionary advantages conferred by these changes rendered the hominid brain vulnerable to insults. I argue that schizophrenia exists as a costly trade-off in the evolution of social cognition and the creative mind.

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Economic Psychology, Hamilton's Rule, and Evolutionary Neuroscience

Hamilton's rule of inclusive fitness is proposed to be the gene's eye complement to MacLean's evolutionary neuroscience and the CSN model derived therefrom. This linkage permits the development of mathematical algorithms and equations expressing a dynamic relation among neural architecture, social exchange, and economic psychology. The paper extends material reported in the forthcoming *The Evolutionary Neuroethology of Paul MacLean (Greenwood)* by the author and Russell Gardner, Jr. as well as other recent publications by the author.

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POST-CONFLICT BEHAVIOUR AMONG JAPANESE CHILDREN

We studied post-conflict behaviour among 3-year-old and 4-year-old Japanese children in Tokyo with the aims of revealing the age-related difference of reconciliation strategy and its function. Analysis of 157 cases of Post-Conflict behaviour (for 10 mins) and Matched-Control showed that three-year-old children reconciled by explicit strategies more than by implicit ones, but 4-year-old children did not. We recorded self-directed behavior (SDB) as an index of stress, and found that the frequency of the victim's SDB was elevated following aggression but decreased rapidly following reconciliation, suggesting that reconciliation functions to reduce the post-conflict stress caused by the aggression.

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DO men exhibit a MONTHLY TESTOSTERONE cycle?

The individual time patterns of daily morning salivary T of adult healthy men, self-reported sexual behavior and their co-occurrence with regular weekly or monthly intervals were studied. Data were analyzed with Theme™ (Magnusson 1996) to detect events in which increases of T were associated with sexual activity and, at the same time, to control for regular internal patterns in men. First results indicated a varying number of complex non-random interaction patterns of T with sexual activity, but also with weekly (i.e. Saturdays) and monthly intervals (i.e. 28-days fullmoon intervals). The social context of the occurrence of specific pattern combinations was elaborated using parameters from the men's self-reported general life history profiles. Peak hormone levels occurred around weekends in the majority of the males. The 28-days monthly interval coincided with T peaks only in those of the paired men who reported a current wish for children ('prospective fathers'), but not in unpaired men or in those who did not wish to have children with their current partner. Rather than representing a direct regular pattern of the male T per se, the observed patterns suggest that men have the facultative potential to adjust their T responses to their female partner's cycle. This study adds an example for the mutual character of hormone-behavior interactions, and thus, for the social context of T patterns in human males and is the first to examine

'prospective fathers', i.e. the males' commitment to reproduction as a variable for the interaction between T and sexual activity.

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INFLATION OF THE SEXUAL MORTALITY RATIO IN MODERN SOCIETIES

It is known that men die at higher rates than women, however few may be aware of the striking mortality patterns by age group and cause of death. We divided male mortality rates by female mortality rates to obtain the Sexual Mortality Ratio (SMR) for 11 age groups across decades of the 20th century and examined mortality causes in the U.S. We examined the pattern of SMRs across nations and the relationship to economic and social indicators. Dimorphism in mortality rates stems from an interconnected set of biological, behavior, and social causes, which are best understood in an evolutionary framework.

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An Israeli's voyage to Evolution Island

"Sociobiology" or "Evolutionary-Psychology", are not yet regular courses in Israel. On the other hand, Evolutionary popular-science books are translated and very well sold. Perhaps on first, intuitive, emotional, level of perception, evolutionary ideas are warmly accepted. But on the rational, philosophical level they are denied, as they threaten the idealistic approaches. Jewish people hold long tradition of idealism. They were, probably, first to adopt agriculture and to cultivate human made culture of ideas. 2000 years of Diaspora deepened the gap between Man and Nature. Evolution gives matter all power of explanation, and therefore is rejected.

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Individual differences in human infant cry

In this study we applied statistical techniques for testing the individual discrimination of human infants cries. We recorded a total of 1628 cry units from 32 infants in their first and second day of life. Results. The discriminant function analysis showed that 62% of the cries could be correctly discriminated on the base of sex and that twentytwo (69%) infants, subdivided in six smaller groups, could be individually discriminated. However, only the 53% of the cries could be correctly ascribed to an individual infant. The only significant parameter for successful discrimination was the total amount of cries from an infant.

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MATERNAL INFANTICIDE AND INFANT ABUSE IN CAPTIVE HAMADRYAS BABOONS

Female infanticide is rare among primates; nonhuman primate mothers are thought to terminate maternal investment based on their own condition or social situation and not based on infant quality. We report two incidents that indicate that female *Papio hamadryas* occasionally decide to cease investment in current offspring based on their infant's poor physical condition: one female actively kills her weakened infant and one female first neglects and then maltreats her weak new-born infant. This implicates that nonhuman primate mothers care less unconditionally than expected. These cases are discussed in the light of the social pathology and the parental manipulation hypothesis.

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Pheromones and allomones at war

Pheromones/allomones are ideal for use in war. Natural products that do not kill or incapacitate, they are allowed under the terms of the Geneva Convention. Pheromone fuses can be applied to land mines and other stealth munitions to ensure appropriate triggering.

Acute uses of human pheromones, such as explosive dispersal, have valuable utility to limit battle

casualties, destroy enemy morale. Pheromones can be used to interrogate, improve peace-seeking and to treat homesickness in service personnel overseas. More potent than nerve gas, pheromones are effective at the ultra-trace level while remaining imperceptible and non-lethal in all but chronic exposures.

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GENDER DIFFERENCES IN FRIENDSHIPS

Psychological sciences claim that gender differences regarding friendships exist. In this study we examine whether and in what way this can be confirmed by an evolutionary approach to human behavior. Due to the presumed patrilocal way of living of human ancestors, which is also found in still existing hunter-gatherer-societies, females should have evolved to be socially more active. We therefore hypothesize that in urban societies women still have more intimate relations to a greater number of people.

300 people from Vienna (aged 22-35) participated in a survey providing information about the number of close friends, types of problems that are discussed, and commitment in terms of time, money and privacy.

Our results mainly support our hypotheses.

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The Ethology of Ancient Sparta: The Biological Contradictions of Dysfunctional Culture

Utopians of the left and right have been fascinated by Sparta's supposed equality, liberated women, and mixed government. In reality Sparta is a good case study of a culture that survives despite working against the reproductive success of its members.

A closed corporation of elite clans based on a static feudal agricultural system used hypergamous marriage, infanticide, birth control, even limited polyandry, to consolidate land and wealth in a fierce game of status acquisition that excludes the majority of citizens from participation. The government was a violent and closed police state.

Sparta's dystopian culture persistently interfered with the life chances and biological imperatives of its members. A cultural design that took human biology into account would have been much more successful.

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GETTING THAT FEMALE GLANCE: PATTERNS AND CONSEQUENCES OF MALE NON-VERBAL BEHAVIOR IN COURTSHIP CONTEXTS

Female choice in courtship contexts is often communicated through nonverbal signals. Given that a female knows little about a heretofore-unacquainted male, upon what dimensions do females base their courtship

decisions? Here we report two studies that investigated male nonverbal behavior correlates and female choice in courtship contexts. Study 1 documented male nonverbal behavioral patterns that preceded successful 'contact' courtship initiation with females. Study 2 used case studies to analyze male nonverbal behavioral changes in a bar context when females were absent compared to the same bar context when females were present. A consistent pattern emerged across studies. 'Contact successful' males exhibited more Glancing behaviors, Space Maximization Movements, intra-sexual touching (particularly of the non-reciprocated type), and less Closed-body movements than 'Non-contact' males. Additionally, as the mate-relevance of the context increased, males across Study 1 and 2 exhibited a specific pattern of increased space maximization movements, glancing behavior, and increased auto-manipulations. Findings are discussed within an evolutionary framework in terms of male self-presentational motives and female mate choice.

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9/11, 2057, EXPONENTIAL GROWTH AND THE EVOLUTION OF SELF-DESTRUCTION

We at ISHE know the proximate and evolutionary reasons for 9/11 but we can't stop the exponential growth of destructive technologies. Today's bombs and supergerms are kid's play compared with what's coming. Within 50 years or so there will be thousands of McVeighs and Attas with access to many new technologies of mass destruction hundreds of Verdanas more devastating than what's available now. Soon one person will be able to destroy most life on earth. It seems impossible to control human behavior enough to prevent future holocausts far worse than anything before. Does the evolution of intelligence inevitably cause its own extinction?

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CORRELATES OF SATISFACTION IN CHINESE MARRIAGES

Many criteria such as similarity may operate in both mate choice and in mate retention. Generally, the more similar a couple is, the happier and more stable their relationships. Similarity however may be offset by dominance, which seems to characterize males that females find desirable in many primate species. Furthermore, cross-cultural evidence suggests that attractiveness, particularly in females, may enhance mate value. 419 Chinese couples were surveyed to test homogamy (similarity), male dominance, and female attractiveness hypotheses in that society. Results are compared to a companion study on British couples (Weisfeld, Russell, Weisfeld & Wells 1992), and cross-cultural evidence is provided for some sociobiological factors that influence marital satisfaction.

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GROUP SELECTION AND INDIVIDUAL GULLIBILITY

Cognitively, human minds are ill-prepared by natural selection to perceive emergence, the extra achievement of groups that arises from their good functioning as groups. On the contrary, we tend either (1) to attribute the non-additive productivity of the group to one of its members, investing him or her with special powers of "leadership" (e.g., demagogues), or (2) to invent a supernatural member of the group - a spirit or god - to account for its hyper-productivity. Either method of resolving the cognitive problem posed by emergence is likely to make the group more focused, more cooperative and more productive. Thus, selection at the group level will favor such cognitive misattributions because they make groups more coherent and enhance their emergent qualities.

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RITUAL COMBAT, POWER PARITY, AND THE LOGIC OF ASSESSMENT IN FIGHTING; REFLECTIONS ON WRANGHAM'S 'IS MILITARY INCOMPETENCE ADAPTIVE?'

Van der Dennen's, Keeley's, and Gat's research fully corroborated earlier findings (e.g. Turney- High) that warfare in foraging societies ('primitive' warfare for short) consists mainly of two distinct patterns: the raid (dawn attack), and the (pitched) battle (often ritualized). Wrangham recently suggested that the raid ('lethal male raiding') may be a hominid-panid synapomorphy (meaning that this pattern evolved in the common ancestor of both chimpanzees and humans), and is commonly precipitated by imbalances of power. Wrangham claims that in wars of the pitched battle type, on the other hand, assessment is faulty or inaccurate ('military incompetence') because this type of warfare did not evolve as the 'lethal male raiding' pattern did.

This paper presents some critical reflections on, and alternative interpretations of, Wrangham's hypotheses, and discusses 'military incompetence' in relation to historical battles, principles of tactics, the role of 'necessita' (Machiavelli) and the 'fog of war' (Thucydides, von Clausewitz, Fuller), and the concept of battles as 'divine ordeals' in contemporary warfare. It also presents my recent work on the (chrono)logically possible theoretical positions on the evolutionary origin of war.

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MULTI-SAMPLE EVIDENCE FOR A SEX DIFFERENCE IN ESTIMATES OF HUMAN NONPATERNITY RATE

Evolutionary theory predicts human nonpaternity (HNP), the discrepancy between social/legal and biological paternity. To date no study has asked people their estimates of HNP rates. We implemented such an item in surveys concerned with relationship issues, and administered it to Austrian community samples (n = 954, 243, 157, and 208). We hypothesized a sex difference in HNP estimates, with females stating higher estimates, owing tacit knowledge, relative to males. An effect in the predicted direction emerged (Cohen's $d=0.41$). Generally, both sexes' HNP estimates were around 10% levels, which is more in accord within direct HNP estimates than with genetic HNP data