For evolutionary psychiatrists, psychologists and others interested in sociophysiological integration

ASCAP

Volume 9, No 6, (Cumulative #103) June 1996

" I don't like the middle game of science. There are only two games worth playing: the opening game and the end game. And it's given to very few to play the end game, so I like playing the opening game."

Sidney Brenner, 1996.[1]

Across Species Comparison and Psychopathology (ASCAP) Newsletter Aims

- ♦A free exchange of letters, notes, ankles, essays or ideas in brief format.
- ♦Elaboration of others' ideas.
- ♦Keeping up w ith productions. events, and either news.
- ♦Proposals for new initiatives, joist research endeavors, etc.

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Previous volumes are available. For details, contact the Managing Editor: Frank Carrel, at the above address.

ASCAP Society Mission Statement

The ASCAP Society represents a group of people who view forms of psyehopa-thology in the context of evolutionary biology and who wish to mobilize the resources of various disciplines and individuals potentially involved so as to- enhance the further: investigation; and study; of the conceptual and research questions involved. This scientific society is concerned with the basic plans of behavior that have evolved over millions of years and that have resulied in psychopathologically related states. We are interested: in the integration of various methods of study ranging from cellular processes to individuals in groups. The ASCAP Nevwletter is a function of the ASCAP Society,

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ADDRESSED TO & FROM ...

Report on Annual ASCAP Society Business Meeting.

By Russell Gardner, Jr., Secretary

Dr. Leon Sloman, outgoing president, presided over the business meeting and the formal sessions that followed it for the full day at the New York Hilton on Sunday, May 5,1996.

The minutes of the 1995 meeting in Santa Barbara had been previously published and were accepted as printed in the July 1995 issue of *The Newsletter* (1995;8(7):2-3).

New officers became Dr. Kent Bailey as incoming president. Dr. Daniel Wilson is President-Elect, but was unable to be here this year.

Dr. Mark Erickson will be the new First Vice President and Dr. Russell Gardner is the incoming Second Vice President.

The group enthusiastically expressed appreciation to Robert Hirschfeld and the Department of Psychiatry and Behavioral Sciences at UTMB for a financial contribution that helped keep things afloat this past year, and the Foundation for Cognitive Therapy and Research of Philadelphia made contributions for the Aaron T. Beck ASCAP Award and operating costs.

While appreciations were being expressed, we noted specially felt gratitude to Erica Ainsbury for establishing the newsletter format and providing critical assistance after the departmental downsizing. We thanked Dena Stringer for her several months of work and welcomed with enthusiasm Frank Carrel as the new managing editor. He has expressed interest in establishing a Web page to publicize the table of contents of each issue as well as an attractive excerpt from the issue contents. The group thoroughly endorsed his initiative and this source of potential society members.

The secretary-treasurer was happy to report that the increase in subscription costs has not hampered subscription numbers, and that issues sent out to mailing lists of other groups have produced new subscriptions.

The ASCAP Society remains an informal organization based at UTMB: it is small (105 subscribers/members). Its function hinges around the newsletter and depends on UTMB administrative structures. There is no incorporation, nor formal structure with rules and regulations.

Dr Bailey expressed some interest in his presidency in drafting bylaws, rules and regulations for the society. Should there be changes in the way we do things? Let us know your thoughts.

The group suggested that we should proceed slowly and that growth continue to be centered around *The ASCAP Newsletter.* The current format was approved, deploying as it does articles, the to-and-from the editor section, E-mail excerpts preserved in archival form, and abstracts and extracts.

Plans strongly endorsed for the future include that John Price will be the European editor and that associate editors for topic areas will be appointed by Dr. Gardner and Dr. Price. These will have responsibilities especially for stimulus articles followed by about five organized responses.

There was discussion of whether the newsletter should in the future be peer-reviewed or peer-reviewed in part and explorations of whether it would fill a niche as a journal.

That an editorial board be formed by Drs. Gardner and Price was endorsed, perhaps in part by the present and past officers who are interested as well as the above mentioned associate editors who are concerned especially with particular topic areas. So far, those agreeing to participate are: Mike Waller, gene-centric theory;

Michael Coe, attachment issues; and Tim Miller, evolutionary psychotherapy.

The annual meeting being associated with the APA this year has not in itself generated many more attendees, in part because there are large numbers of competing meetings. The group felt that its timing should be related to the Human Behavior and Evolution Society next year.

The group resoundingly endorsed the Aaron T. Beck ASCAP Award funded by the Foundation for Cognitive Therapy and Research of Philadelphia. They felt that it should continue so long as the Foundation is willing, but that we must make efforts to elicit more essay contributions. President Sloman appointed Dr. Erickson to once again chair the committee in conjunction with the managing editorial staff at UTMB.

This meeting earned the physician participants six category IAMA CME credits. The group was grateful and noted that the scientific meeting had achieved laudably increased organization, but were unsure about whether the benefits outweighed the costs.

We will not pursue such accreditation in the near future. Most of the physician participants had other sources of CME credits and didn't need these.

Compliments to the Beck Awardee

Regarding the excellent award essay: I'm convinced that loss of control or lack of control is a big part of depression. Voluntarily becoming less or subordinate is one thing as one eventually accepts the inevitable. Those can be adaptive. But losing one's control over life-events or feeling that one has not control is totally different. At some primordial level, the patient feels disconnected, tossed chaotically about without a purpose.

It would be interesting if that study were done from the other two points of view: with no instructions as to the duration of the fantasied relationship and then with instructions to consider only short-term relationships. I'll wager that male responses would change in the latter case but not in the former and that female responses would remain pretty much the same. Male emotional investment in one-night stands is close to nil; they are simply sewing their wild oats in the old vernacular. But females always have some feeling of hoped-for commitment— I assume in the case of pregnancy.

It was interesting that females rated mutual love and affection and mutual sexual and physical attraction as more controllable than males did. There we go again, we women taking responsibility for another's feelings. What a great way to set ourselves up for failure. That certainly contributes to depression.

Anyway, this was a truly fine piece of research. Ms Ben Hamida is to be commended.

Carolyn Reichelt

Mind-Body Wrongly Named

Yes, I have pondered "How authorities speak of how the mind-body problem is wrongly named..." and things of the such. Enclosed is my $35.1 am delighted to be a member and I am currently working on a paper regarding the "nature of man" and would appreciate forum feedback such as I might receive via the newsletter.

Kevin Byers

Please E-mail any contributions to ascap@beach.utmb.edu, or mail hard copy and 3.5" HD diskette to Russell Gardner, Jr., c/o Frank Carrel, Dept of Psychiatry & Behavioral Sciences, University of Texas Medical Branch. Galveston TX 775550428, USA. WordPerfect, Microsoft Word or ASCII format pre ferred. Diskettes will be returned to you Thank you.

ADAPTIVE VALUE OF LARGE BREASTS

Bowlby discusses nipple-sucking in infants as a way of hanging on while mom is moving about, and treats the urge to do so as being partly a genetically programmed mechanism for maintaining safe proximity to mom — a quite separate issue from feeding. For the present question, this means it may not matter how much babies actually feed while being carried, since they also suck for comfort and to maintain physical proximity and as a means to not be dropped. I'm not sure this provides much of an argument for large human breast size, since other primates seem to do fine without it.

Bowlby (1969/1982) Attachment, 249-250 says:

"Though sucking is usually thought of as a means simply of ingesting food, it has a further function. All primate infants, human and sub-human alike, spend a great deal of time grasping and/or sucking a nipple or nipple-like object, although for most of that time they are obtaining no food. In human babies sucking of thumb or comforter is extremely common. In monkey babies brought up without a mother it is universal. When they are brought up with a mother, however, it is the mother's nipple that young monkeys suck or grasp. As a result, in natural conditions a principal consequence of non-nutritional sucking and nipple-grasping is that the infant maintains close contact with mother. This is emphasised by Hined, Rowell, and Spencer-Booth (1964) who point out that, when a rhesus infant is clinging to its running or climbing mother, it is usually attached not only by its two hands and its two feet but also by its mouth, which grasps one or even both nipples -- in fact, a five-point hold. In such circumstances, then, nipple grasping fulfils the same function as clinging....

"In fact, far more time is spent in non-nutritional sucking than in nutritional...."

"...the baby able to engage in on-nutritional sucking is likely to become more content and relaxed than one not able to... it is especially when he is upset or alarmed that a human child engages in non-nutritional sucking... non-nutritional sucking of human infants is an activity in its own right and separate from nutritional sucking... non-nutritional sucking is an integral part of attachment behaviour and has proximity to mother as a predictable outcome."

Michael Coe
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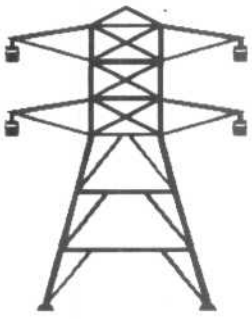

Announcement of New Book HOMO BIOLOGICUS An Evolutionary Model for the Human Sciences

by Charles Elworthy This book presents a model of human characteristics as a proposed link between the social and natural sciences. In the social sciences there is an increasing realisation that conventional assumptions, such as the retionality and selfishness of Homo *oeconomicus,* are incable of explaining observed behaviour. In the natural sciences evolutionary theory provides a general explanation for the existence and features of living organisms, but has been unsuccessful in the specific problem of explaining our own actions.

Rather than following the unsuccessful path of proceeding directly from evolutionary theory to human behaviour, this book argues that a knowledge of evolutionary processes should be used as an aid to understanding the psychological mechanisms that underly each person's conduct. These mechanisms are specific to particular domains, and are thus not captured in the conventional social-scientific assumptions. They are, however, maximising, so that it is possible to continue to use appropriately modified techniques.

Four (4) case studies indicate the superiority of the proposed model of *Homo biologicus* over the established *Homo oeconomicus,* but despite the adoption of aspects of economic methodology, the explanations themselves are not limited to particular disciplines.

The generality of the evolutionary and psychological arguments thus allows the linking of formerly separate research within a coherent general framework for the human sciences.

The book contents are as follows:

I. Introduction
II. Elements of Evolution
Hierarchies & Reductionism
Elements of the Evolutionary Process
Levels of Selection Other Replicators & Vehicles
III. Adaptations & their Characteristics
The Meaning of Adaptation
Adaptations from Four (4) Perspectives Analysing Adaptations
IV. Evolution & the Human Psyche
The Cognitive Level & Evolutionary Psychology
Investigating the Cognitive Level
Evolutionary Psychology & the Wason Selection Task
Accounting for Hominid Cognitive Development
V. From Psychology to Behaviour
Genetic Maximisation
Kin-Group Maximisation
Group Maximisation
Aggregate Maximisation & Non-Optimality
VI. *Homo Biologicus* & Human Characteristics
Characterising *Homo Biologicus*
Homo Biologicus vs. *Homo Oeconomicus* Linking the Human Sciences Evolutionary Research & Human Characteristics.
VII. Summary & Implications

To order this book, write or fax:
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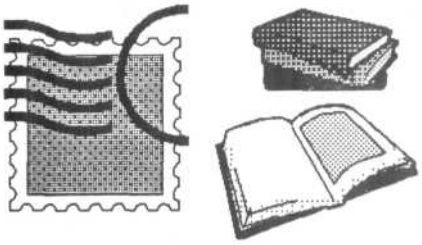

RESPONSE TO THE IDEA OF SOCIOBIOLOGY

On 6/3/1996, Rafael Gray wrote:

I'm a psychiatrist and I find the social effects of various psychiatric medications fascinating. I feel for many patients the use of these medications in facilitating psychotherapy (which is afterall a social relationship) much more than the party line "if you're not depressed then you can work better". Of course in some "personality disordered patients" they can also be very effective (most "personality disorders" are just describing inflexible patterns of social relationships) One way I like to view what I am doing "in a medical model" is that the brain "metabolizes social interactions" in the same way that the liver metabolizes chemical toxins. (Simplistic yes - but many patients understand this - it is a far more useful explanation than "you have a chemical imbalance" which is basically a meaningless statement).

I have trained at UCSF in the residency and recently graduated, although I am a clinical instructor there on the Consultation-Liaison Psychiatry Service.

I have read a lot on various themes, none of which really have much to do with my formal training. In college I was interested in books, e.g. E.O. Wilson's *"Sociobiolog/,* Dawkin's *"The Selfish Gene"* and work by Hamilton & Trivers on things like population ecology etc. I have found primate work concerning SSRIs in primate hierarchies interesting, as well as the *"Chimpanzee Politics'* by deWaal. I also was intrigued by the more recent writings by various people on "evolutionary medicine" like Robert Wright etc. Lots more stuff but I won't get into it. Of course, there are always the stories of my patients.

The other more traditional psychiatric area that is influential for me are the temperament studies, Bowlby being the pioneer but also more recent stuff by Stella Chess, Jerome Kagan, etc. I'm also interested in Cloninger's dimensional personality theories.

It certainly makes practice far more interesting than just treating "DSM-IV disorders. There are many people that are integrating these kinds of ideas in their practice - probably more than are willing to admit since it isn't quite within the traditional psychodynamic model.

Looking forward to your packet[1]

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ARTICLE:

by R Gardner
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Report from the 29th Gatlinburg conference on Research in Mental Retardation, 3/25-3/27/96
Historiography of the Causal Analysis of Mental Retardation by John Opitz

Summarized by Russell Gardner, Jr.

Persuaded by Deborah Pearson and Kate Loveland from the University of Texas Health Science Center at Houston, I attended the above conference which has overthe years emphasized behavioral issues in mental retardation (MR) and developmental disabilities (DD). Guided by a theme committee headed by behavioral pharmacologist and Prader-Willi Syndrome expert Travis Thompson of Vanderbilt University, the emphasis this year was on genetics. A preconference seminar included a three part primer on genetics for participants, and five plenary speakers on various genetically caused conditions flanked symposia and paper sessions.

The last three spoke on language disability and on the fragile X and Down syndromes. The conference was unusually well planned, the plenary speakers had universally focused their talks in a specific way on the audience and developed their stories with grace and comprehensibility; their information was for me new and highly stimulating. Possibilities for new collaborations and research ideas swirl in my head, hoping for enough time to give them attention.

The lead-off plenary speakers included the founding editors of two journals, John Opitz, M.D., founder and continuing editor of the well established and prestigious *American Journal of Medical Genetics,* and Mark Batshaw, of the new *Mental Retardation and Developmental Disabilities Research Reviews.* A side benefit of conference registration included a free copy of the Vol 1, No. 4,1995, issue of the latter journal, which featured a comprehensive series of review articles on the Fragile X syndrome. The eleven abstracts will be replicated in *The ASCAP Newsletter.*

But here I summarize the plenary address of John Opitz who now lives in Helena, MT, where he is director of an institute concerned with MR. He had worked for many years at the University of Wisconsin where he described the first three cases of the Smith-Lemly-Opitz syndrome well known to geneticists. Opitz spoke on "Historiography of the causal analysis of mental retardation." After the presentation, many hearing it considered it a tour de force and several suggested that he should write a book-length definitive history.

Opitz noted that he had worked and reworked his talk, but fundamentally he had but two things to say, first that there is a much stronger relation between biology and history than people realize. By analogy, the association is as intimate as love and sex or spirituality and religion. Points he made in this connection especially made me feel that his talk was important for *ASCAP.* His second point was there had been remarkable developments within a one century period, the nineteenth.

Going to the dictionary, he defined historiography as "the writing of history based on the critical examination of sources, selection of particulars, and the synthesis of particulars into a narrative that will stand the test of critical examination." He noted that genetics is the study of biological variability. He noted Darwin's 1859 emphasis on the course of development of individual organisms. Opitz stated that there is a historical duality of all living organisms: ontogenetic and phylo-genetic. In developing this, he alluded to precambrian rocks near his home in Helena which are 3.5 billion years old, about the age of living organisms, emphasizing again the convergence of history and genetics, and the fact that all biology is history. All that develops, whether normal or abnormal, has evolved from primordial forms.

Because of the evolutionary constraints on the number and types of final common developmental pathways (fields) nothing can occur in developmant that evolution

has not made possible. The relative few differences that genome dictates include distinctions between dorsal-ventral and forward-backwards distinctions within the body framework and such phenomena as segmentation. Things that we look upon as abnormalities, are, in fact, things that came before. He quoted T. Dobzhansky from 1972, that "Nothing in biology makes any sense except in the light of evolution." From this perspective there are not malformations of the brain, but *vestigia* and *atavisms.*

... The remarkable developments within the nineteenth century included the affirmation of epigenesis as well as the definition and development of morphology...

Vestigia represent persistence of earlier developmental stages and their consequences.
Atavisms are rare occurrences of early phylogenetic states. Darwin popularized this idea though he didn't originate it. Examples of vestigia include anomalies of incomplete development such as incomplete neural tube closure, incomplete migration of cortical neurons that then present as lissencephaly (smooth cortex without gyri or sulci). Atavisms on the other hand include absence of corpus callosum as is normal in monotremes and marsupials which represent early times in the heritage of mammals; hence agenesis of corpus callosum in humans is both an atavism and a vestigial anomaly. Not that human development can't happen perfectly well despite agenesis of this usually massive structure: he cited the autopsy finding of no corpus callosum in a tailor with 6 languages who had functioned most adequately during his lifetime. Dr. Opitz predicted that a cell adhesion molecule will eventually be . seen as figuring in this odd developmental variant.

The remarkable developments within the nineteenth century included the affirmation of epigenesis as well as the definition and development of morphology (as we compared notes after his talk, I found on my computer file that Karl Friedrich Burdach was the first person, in 1800, to use the term "biology" for something we today call anthropology followed in 1802 by Lamarck who gave it the modem definition; Opitzwas very familiar with Burdach and told me that he also coined "morphology." Back to the narrative, Opitz noted that the nineteenth century featured the threefold parallelism in the histories of the earth, organism and species. Von Baer's laws on the historical relationship between the development of individuals and species were articulated in 1828 and anticipated Haeckel by more than a half century. Owens coined homologyand Darwin described atavisms as well as providing a mechanism for biological evolution. The cell theory and cytology were articulated. Teratology was pioneered by Etienne St. Hillaire Sr. in Napoleonic days and his son (Jr.) developed the area. And of course genetics was founded by Mendel (though named by William Bateson in 1905) and human genetics by Galton who coined "eugenics" in 1882.

While historically important, Opitz noted that eugenics is not a concept that has survived even though it fostered some dubious social programs, the remnants of which were still extant in his early career (sterilization of those with subnormal intelligence, for instance: He told how one such multiparous woman managed cleverly to evade the surgical authorities in Iowa just 4 decades ago).

While these may have been the most important features of Opitz's presentation, he then did go into detail on the history of how the causes of MR were considered. He referred to Leo Kanner's 1964 *A History of the Care and Study of the Mentally Retarded.* Its frontispiece, one of the earliest photographs from 1853, depicted the first asylum for people with MR. The Swiss founder (whose name I didn't catch) was a clever publicist and the originator of the colony concept, but who ignored the most simple facets of therapy such as assuring adequate iron in the diet.

Opitz particularly noted the colony concept as he worked in the Madison-based Wisconsin Colony for many years and did the first thorough workups of his pediatrician career. Indeed, he showed a picture of Richard Sheerenberger"s 1983 *History of Mental Retardation.* Sheerenberger had been the founder of the Wisconsin institution.

Opitz then turned to 19th century reflections on development. MR was usually considered a single entity with different severites, *qua* idiocy, amentia, fatuitas, imbecillitas, suptiditas, stultia, and morosis (the concept of morons was introduced as late as 1810). This assumption of dedifferentiation persists to this day, especially in the social science based disciplines. Elisabeth Dykens, Robert Hodapp and Connie Kaseri from UCLA held forth in an excellent conference symposium that behavioral phenotypes should be emphasized. Dykens noted that there are two cultures now in the C.P. Snow sense, two groupings that look at the same phenomena but never talk to each other about it. They argued that Prader-Willi, Fragile X, Williams and other syndromes exhibit distinctive and different behaviors, although measurement techniques and other concepts that the social sciences have developed must be importantly deployed for the best development of the research arena. Within and between comparisons of the attributes of such behavioral phenotypes are requisite for future work.

Opitz noted that the first distinguishable syndrome to emerge was that of cretinism, fetal thyroid deficiency on the basis of too little dietary iodine. Belhomme in 1824 expressed his opinion that "cretins" present the only variety to be found in idiocy. In the next decade, Troxler delineated forms of cretinism: endemic goiter, albinism, deaf mutism, and idiocy.

Then at the half-century exactly (1850), Champault noted iodine deficiency and this in turn led to treatment: iodine cured the condition. Opitz recalled cretins and adults with iodine deficiency goiters from his early days in northern Bavaria and expressed that some of the most important work in the prevention of mental retardation stems from such simple measures as iodine supplementation. (I recall with gratitude taking iodine tablets during my own early days in a one room, eight grade, Wisconsin school house.) Opitz then turned to John Langdon Haydon Down who lived from 1828 to 1896. He was a physician who headed the asylum for Idiots at Eastwood. In 1866 he postulated that the "Mongolism" disorder later given his name had ethnic origins. His grandson, Reginald Langdon Down, born in 1906, occupied the same position and rejected the interpretation, noting that the resemblance of those afflicted to Mongol stock was in fact very superficial. In addition to Down in 1866, others who noted the condition included Sequin in 1812, Lombroso in 1873., Fraserin 1875, and Mitchell in 1876. Neumann in 1899 made the first presentation of DS on the continent. In the audience Rudolf Virchow, the first pathologist, vehemently rejected Neumann's contention. On another occasion, as we have previously noted in *The ASCAP Newsletter,* Virchow also rejected the idea of Neanderthal man.

Causal studies of MR in the 19th century included gradation of severity by Belhomme, Voisin, and Esquirol. Down's causal classification included congenital, developmental and accidental causes. William W. Ireland became the medical superintendent of the Scottish National Institute for Imbecile Children. He thought there were twelve types of mental retardation. By the late 19th century (1870), there were generally considered to be three entities, Mongolism, cretinism, and microcephaly. Although tuberous sclerosis (TS) was reported by von Recklinghausen in 1863, the triad of seizures, sebaceous adenomata and mental deficiency was not described until Vogt did so in 1908. Now we know that TS possesses a genetic heterogeneity with loci at chromosomes 16p.13.3 and 9q33-34.

The 20th century produced the biometric legacy, the eugenic legacy, advances in biochemistry and new-born screening, advances in cytogenetic analysis, and other molecular methods. Changes in environment included iodized salt at the beginning of the century, immunizations & vaccinations, nutrition, fluid and electrolyte therapy of dehydration which has been a potent cause of brain affliction in children, antibiotics, removal of lead, and accident prevention. *c8*

ARTICLE:

by Kalman Glantz

From Optimal Foraging to Sub-Optimal Behavior

Since the intellectual orgy that produced "inclusive fitness," "kin selection," "selfish gene" "reciprocal altruism," "reproductive strategy," "parental investment," "parent-offspring conflict," and "the EEA," I have encountered few new concepts in evolutionary theory that have strong implications for psychotherapy. "Domain-specific Darwinian algorithm" is the only exception that readily comes to mind.

If delay is the mother of hope, I have been primed for enthusiasm. Perhaps that's why Bruce Winterhalder's article in the last issue *of Ethology and Sociobiology* impelled me to write this brief notice.

The article is entitled, believe it or not, *"A marginal model of tolerated theft" (Ethology and Sociobiology,* 1996; 17:1). Winterhalder is a pioneer in the field of optimal foraging theory. His goal in the paper is to . correct and improve the models that attempt to account for the foraging behavior of animals, human and otherwise. It's a long way from the helping professions.

However, his insertion of the hallowed economic concept "marginal" into the discussion opens a psychological window that could help to explain human phenomena that are far removed from foraging.

For those who haven't read the paper, I will give a little (highly-simplified) background. Nicholas Blurton-Jones introduced the idea of "tolerated theft" to explain how sharing and reciprocity might have evolved in a population that didn't initially share or reciprocate. If individuals start by mutually tolerating theft because: (a) there is enough to go around and, (b) fighting would reduce fitness, active sharing and reciprocity could reasonably evolve, provided individuals in that society had a high probability of interacting frequently overtime. But how to calculate when it would be worthwhile to tolerate theft and when not?

Winterhalder points out that once a forager-called the Giver-has gobbled a hunk of meat, for example, the value of the next chunk declines. The value of the second piece is less than the first, the value of the third even less, and so on. That is to say, the "marginal value" to the Giver" of each piece declines as another piece is eaten.

However, to a potential "thief,"-the Taker-who hasn't eaten, the "next" piece is the first. The first piece has very high marginal value, and so the Taker will be relatively motivated to fight for it. Therefore, the willingness of a Giver to defend a packet of food should decrease progressively as she eats.

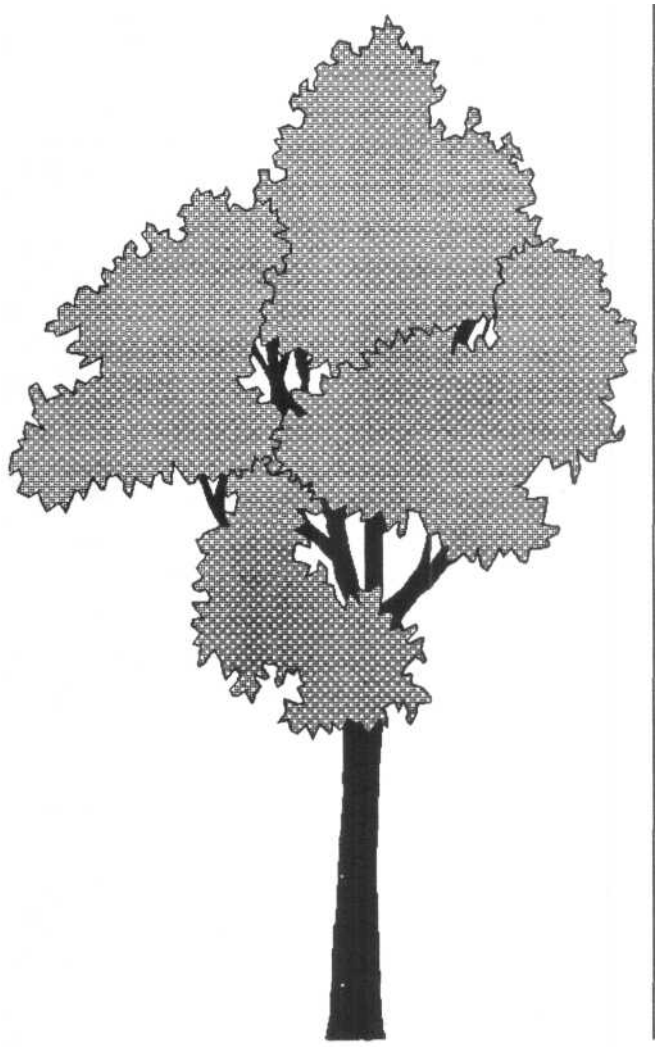
It seems safe to assume that the marginal response is a Darwinian algorithm for dealing with resources. The most graphic expression of the algorithm is the well-known phenomenon of professional athletes who stop producing once they hit it big. Their behavior is perfectly "rational"; what is the marginal value of another gourmet meal, another car or another gold earring?

For clinicians, the major relevance is probably what has been called "affluenza" (absence of motivation, leading to depression and alienation, on the part of offspring of the well-to-do). "Affluenza" has the characteristic feel of a Darwinian algorithm operating out of its EEA: a "rational" response that produces symptoms in a sub-set of the population.

If one were tempted to generalize from the individual level to various social phenomena, there is plenty of scope. For example, it seems that there is often a subset of the offspring of elites that is reluctant to defend their countries. One also often finds that a

subset of elites is in favor of transferring unneeded resources-resources lacking in marginal value-to those who don't have them (i.e. to those for whom the resources have high marginal value). These processes might in turn help to explain the rise and fall of nations. As a group accedes to power and acquires resources, it's members can be expected to place less value on those resources, and to be less willing to defend them. This diffidence might hasten the decline of the group.

But back to therapy. I think we have to look carefully at excess guilt, alienation, depression, de-moralization, and related phenomena, to see just how the symptoms are related to the individual's resource-related position. We all know that both lack of resources and a subjective sense of losing are frequently associated with symptoms. Thanks to Winterhalder, we are now in a better position to understand the worried well-off. *c8*



ARTICLE:

by Kent G. Bailey
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Response to Bhagavad Gita

Thanks for the very scholarly and thoughtful article on the Bhagavad Gita and the frontal lobes (March, 1996). The article raised many interesting issues, but I was especially intrigued by the Gita's emphasis on restraint and inhibition. Moreover, most of us would agree that behavioral inhibition is mediated by the brain and its host of inhibitory neurotransmitters. Neurofunctionally, the frontal lobes, as you point out, and the prefrontal areas, as Paul MacLean emphasizes, are at the center of behavioral inhibition and personality make-up as well. Inhibition plays a major role in paleopsychology, and inhibitory processes, across a variety of domains, are discussed extensively in my book, *Human Paleopsychology: Applications to Aggression and Pathological Processes,*: Hillsdale, NJ: Lawrence Erlbaum, 1987.

Freedom, liberty, and "do your own thing" are as American as apple pie, but the world's great moral philosophies and religions all revolve around personal, social, and cosmological restraints. In a world of theoretically infinite behavioral possibilites, Paul MacLean reminds us that we just keep doing the same things socially, from millenium to millenium. Human nature and human behavior are highly constrained relative to a model of zero constraint, and our daily behavior seems to be composed mostly of evolved species habits, a smattering of socially learned customs and habits, and a good portion of individual genetic variation. We are constrained at every turn, and even the richest, most powerful, and most libertine American is actually very constrained relative to absolute freedom. Even that fortunate person will see how free he is at tax time on April 15!

Human behavior is highly constrained at every level-from the molecular to the political- but the relations between inhibition and order and form are especially intriguing. Evolutionary psychologists have brought human nature back in vogue, but what exactly does that mean? Out of a world of infinite possibilites, the

evolutionary process has shaped, over eons of time, particular species nature for Dryopithecus afarensis, habilis, and sapiens, and then, once shaped, the particular species nature is conserved until selection produces further speciation. Once a species category is established, a given species member does not have the option to change its species classification or to alter its species natures. That nature is conserved for long stretches of time, and species members must march to that nature. Apes and humans have some capacity to (temporarily) transcend their natures, but they quickly regress back to their evolutionary default values.

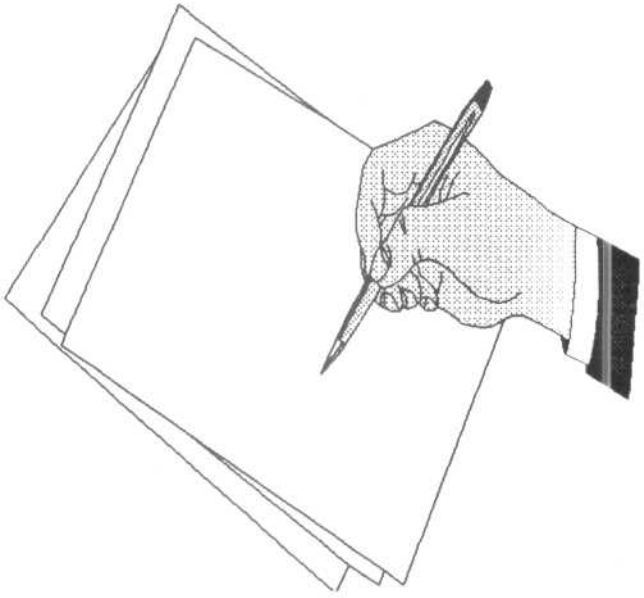
Human nature, in general, or an eye, ear, or nose, are what they are because they have the built-in capacity to resist becoming something else. Their original forms and organization have arisen through the evolutionary process, and the issue now becomes one of conservation and continuity. This issue becomes very clear when we consider cancer, that destroyer of natural form and continuity. Cancer is a failure of natural inhibition, an inhibition that is *almost* failsafe, but not quite. That infinitesimal "not quite" may have deadly and devastating consequences for particular organs of the body such as the pancreas, liver, or stomach, and even the brain itself. In sum, cancer is the destruction of natural form and organization through a submicroscopic disinhibition of species-normal DNA sequences.

This line of argument fits in with my ongoing series on Mismatch Theory in the *Newsletter.* We might assume that a natural order of sorts existed in the EEAs of human evolution, wherein the species nature enjoyed a reasonably good ecological fit with the the external environment. Further, we might assume that this nature-environment fit had a somewhat variable yet definitive form and organization. Given our prior argument, it follows that an individual in the EEA would be motivated to preserve that natural fit, and, once out of it, would aspire to recapture it. Given that modem society is very different from the EEAs of human evolution, we would expect far more time "out of the natural fit" today, and thus, high motivation to seek the fit and frustration at not finding it.

Thus, mismatch might be viewed as an estrangement from natural form and organization that fosters disinhibition of behaviors inconsistent with human nature.

Russ outlines very clearly how damage to the frontal lobes releases socially-inappropriate and out-of-character behavior, as with the dramatic case of Phineas Gage. In essence, such damage compromises the individual's capacity to keep behavior within its species, cultural, and personal constraints, and there is a loss of normal form and organization. Could it be that there are cancers of the mind as wel as the body? The hebephrenic's word salad comes to mind here, as does Hitler's racial ideologies, or Jeffrey Dahmer's sexual and dietary proclivities. Relative to a model of zero constraint, Dahmer's worst behavior represented rather minor disinhibition; at the neurological level. He was neither brain-damaged or insane; he just lost it a few times and lapsed from the currently normal form and order. But by trial time, normal order was recovered and he looked pretty much like the rest of us.

I personally hope that the Gita paper will get us all to talking more about inhibition and disinhibition processes in both normal and abnormal behavior. I think, that Russ has touched upon some very fundamental principles of human nature and behavior. *c8*



ARTICLE:

by M Waller
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Consciousness: Excerpt from E-mail

John A. Johnson wrote:

"Like Rebecca Auge and my good friend Lyle Steadman, I assume a fully materialist, nonmystical, nonspiritual view of consciousness. But I don't think consciousness can be reduced to verbalization, and one doesn't have to be a behaviorist to be a materialist. The nature and function of consciousness remains a mystery. For a list of things we think we need consciousness for but really don't, check out Julian Jaynes's quirky but enjoyable book."

I should like to ask John (and others who think similarly) whether or not his conviction that "consciousness remains a mystery" rests on what might be termed the (Stephen Jay) Gouldian fallacy that "I may not be the master of my fate, but my intuition of wholeness probably reflects a biological truth". Accept this proposition and it certainly does seem strange that we have conscious experience of some small part of our mental processes.

However, we have known (or, rather, evidence has been available) for at least 100 years that our sense of wholeness is a biological trick effected by what Sherrington, its discoverer, called "our secret sense, our sixth sense": proprioception. Without it, as Oliver Sacks makes clear in *"The Man Who Mistook His Wife For a Hat",* mind and body seem to separate, with the former becoming, literally, "disembodied". The effects on the sufferer are devastating, yet despite the sense of consciousness being found exclusively to reside in the disembodied mind, the body continues to carry out its routine processes largely unimpeded. This suggests two things to me. First, consciousness is a latter-day "bolt-on". Second, the Gouldian fallacy has more to do with making consciousness feel part of the corporeal family than it has with the operation of core biological processes.

What then is consciousness' function? I am looking at a schematic representation of brains showing variations in the proportional size of uncommitted cortex in different species: Rat, small; Shrew, little bigger; Tarsius, significantly bigger; Chimpanzee, very much bigger; Human, comparatively huge. And why do we need so much RAM and processing power? Because we are evolutionary opportunists who play the very dangerous competitive game of continually seeking out new ways to exploit our environment.

If we push the computer analogy, we can compare a standard chess-playing computer program with a hypothetical "Win-all" program which, rather than just playing chess, is designed to develop entirely novel games and still win at these. The underlying design of the chess-playing program is essentially algorithmic, having as it's ultimate goal a clearly defined end-state called "check-mate". "Win-all" enjoys no such luxury. It would need something that the chess program does not: a non-specific, super-ordinate goal which might be summarised as "I win". It would not be enough for it simply to conceive of "I" as just one of numerous phenomena within a particular frame of reference. If it were to construct successful strategies for dealing with each new game, "I" would have to be recognised as the centre of analysis, the entity imparting significance to all other actors and objects, and the focus for all plans of action. And, egotist that I am, it comes as little surprise to me that this is very much how I experience consciousness.

Why then all the mystery? All we have to square up to is that, when looking in the mirror, the "I" which so carefully assesses the ravages of time resides not "at the core of our being", but is no more than the orientation device on a very neat little novel problem-solving unit. *c8*

ARTICLE:

by M Waller
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Religion & Health: Excerpt from E-mail

Regarding Lee Kirkpatrick's suggested linkage between religion and John Bowlby's ideas, I should like to pick up the same idea in respect to Darwin. With apologies to those of firm conviction, my inclination is to see the evolutionary origins of faith as arising from the core problem with big brains. I mean by this the inevitable tension between the need to take a clear view on the everyday facts of life in order that our novel problem-solver (i.e. consciousness) can come up with some viable strategies, and the contradictory need to somehow screen our highly sensitive (and, I believe, crucial) sense of self-esteem from the probability that, from a cosmological perspective, we are no more, or less, significant than a grain of sand.

Perhaps it is only in the last 100 years or so that we have been forced fully to face up to this on a scientific basis because of awesome discoveries with regard to both space and time; but to the analytically minded, the evidence of everyday existence must always have been suggestive of an ultimate point-lessness (or, put more positively, that "points" have to be self-generated.) The mason may chisel "Gone but not forgotten" on our tombstones, but in very short order almost all of us are; and even if one could achieve such fame or notoriety as to be remembered as long as the human race continues to exist, we have it on the authority of Mark Twain (and confirmed by Stephen Jay Gould), that our pedigree to date lies in relation to the life of the planet as does the thickness of paint on the top-most rivet, in relation to the height of the Eiffel tower.

I consider this to be the core problem with big brains, rather than an irritating little annoyance, because I place self-esteem at the core of our motivational system. I think that our sense of well-being, and consequentially our mental and psychological health, turns upon our ability to persuade ourselves that we are a comparative success. In the main, this is facilitated by what Festinger called "our drive to self-evaluate", a comparator mechanism which uses our peers as yardsticks. However, such pride as a novice climber might derive by doing comparatively well on a Himalayan foothill is likely to evaporate if he leans back and take in the towering sides of Everest.

Far better not to look at it or, if you must, develop a world view which somehow changes the relativities between you and it. In the Land of the Blind the one-eyed man may be king; but in the world as it is, the prize goes to those with a decent pair of rose-coloured spectacles. Hence the repeated finding that depressives have a more realistic view of their situation than do non-depressives of theirs.

I must stress that I do not mean this unkindly, I was told years ago, but have never checked, that when Marx said the "religion is the opium of the people...", he was not speaking disparagingly. At the time he wrote opium was as likely to be viewed as a medicine as an addictive drug. He simply meant that religion helped make what would otherwise be a pretty intolerable existence for the poor, tolerable. In this - but in very little else -1 am inclined to think him right.

P.S. I think Lee's suggestion that religions tend to be fairly judicious in what they actually ask their followers to do, a little wide of the mark. Take, for example, Easter Island, the Shakers, and Jonestown as cases in which religious ideas and practices proved distinctly maladaptive. It strikes me that this is one area, at least, in which the meme/gene parallel works. Devise a religion, get people to adopt it and, if it's an advantageous meme, you may finish up with the kind of effect the Protestant work ethic is said to have had. Get it wrong, and it will have the same effect on its followers as would a gene for luminosity on a night owl. *c8*

ARTICLE.-

by M Waller
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Cui Bono??? - Excerpt from the E-Mail

I assume that most HBESians, if not members of ASCAP, at least have access to the unfailingly stimulating Newsletter, edited by Russell Gardner.

If there are any poor souls who fall outside this category, may I respectfully suggest that they urgently seek to join the elect.

This last month's Newsletter was entirely devoted to the paper ("Mate Preferences: Implications for the gender differences in unipolar depression" by Souhir Ben Hamida, Department of Psychology, Northwest-em) which has just won this year's Aaron T. Beck Award.

It would take an academician to judge where it stands in the general academic scheme of things, but to my barbarous eye it is what we would call a cracker.

To do scant justice to a sizeable piece of work, it builds on the widely attested fact that whereas young males and females have equivalent rates of depression, the figures for women start to run ahead at puberty, peak in early adulthood, begin to decline at menopause, and only get back to male levels at about 65.

Ben Hamida's approach is to view unipolar depression as akin to learned helplessness and, as such, likely to be grounded in important aspects of the sufferer's life which they view as both unsatisfactory and beyond control.

This conceptual framework is then used in the analysis of experimental findings confirmatory of the general pattern that whereas long-term mate choices made by males are heavily influenced by physical attributes, females show a significantly greater concern with a potential mate's resource acquisition skills.

Summing up the conclusions with a crude simplicity Ms. Ben Hamida would no doubt properly disdain, the message seems to be that females are depressed as a result of feeling themselves continually under critical appraisal in respect of physiological factors over which they have only limited control, whereas males - ever the self-deluders - keep themselves cheerful by maintaining a confident expectation that good times (i.e. heightened sexual attractiveness as a result of material success) are just around the corner.

Given my predilection forwanting to reinterpret all evolved patterns of behaviour in terms of the evolutionary advantages they yield to the genes which define them, I was stimulated by this fascinating piece of work to ask the question: In whose evolutionary interests are these ladies becoming depressed?

I tried to imagine a typical scenario. She, approaching middle age, senses that he is losing interest and knowing that he spends an inordinate amount of time in the company of a younger female, becomes depressed and finds partial solace in drugs and alcohol. He starts to wonder what he ever saw in her and departs with the younger woman.

Cui bono?

Certainly not the older woman. Her responses have been a significant contributory factor in an out-turn which robs both her and her children of material resources, status, and emotional support.

The man? It may serve to up his gene through-put, but at the cost of dropping a significant number of rungs on the resources ladder and taking on a younger wife with whom he may find it increasing difficult to keep up. He is also likely to damage the life chances of his existing gene-carriers (children!).

If the first marriage was a bad one, he may see it as a fairtrade; but I read somewhere that those who engage in a straight "old for young" swaps (a) usually come to regret it within 3 years; and (b) are struck by how much like their first wife their second wife rapidly becomes.

What does the younger woman gain? Certainly she has made a head start in the resource acquisition stakes, although this has to be tempered by the fact that he may well be supporting his first family as well.

She has also acquired an older mate who is likely to die very much before she does, possibly having made heavy nursing demands upon her.

Any young will have a significantly higher chance of a mutant gene because of his age; and (to put it somewhat indelicately) her chosen mate already has a track record of infidelity.

However, if we shift our perspective from humans to genes, we find one little cluster that do "very nicely, thank you" out of such events. I mean by this the genes which code for the behaviour in question.

Genes which encode in males of all ages vulnerability to the attractions of fertile young females, and in females a strong tendency to discriminate strongly in favour of males with a track record of successful resource gathering, are likely to find themselves copied, generation after generation, into males who have an above average chance of being effective resource gatherers and into females who will have an above average chance of being attractive to such males.

Throw in as bonuses (a) the trick of making "losing" players of either sex facilitate the process by acting in ways which amount to giving up (that is where the depression comes in); and (b) the fact that one in every 10,000 or so of the heightened number of mutations arising from May/September couplings is likely to produce a valuable adaptive advantage, then you have as neat an evolutionary stable strategy as any sensible gene could ask for. Were I not a human being I could quite admire it. *c8*

ARTICLE:

by Ferdinand Knobloch
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Individual, group, or meta-selection?

Dealing with altruism, Darwin[1] recognizes that the selfish individuals are favored by evolution. At the same time, he has no doubts -1 quote: "that a tribe including many members who, from possessing in high degree the spirit of patriotism and fidelity, obedience, courage, and sympathy, were always ready to give aid to each other and sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection".

This is puzzling and Darwin lets us down, laments Cronin[2], suspecting group selectionism which she ridicules ("greater-goodism") and, joining Hamilton, concludes that Darwin dealt with human altruism, saw the problem, discussed it, but left it unsolved.

I assume that the discussion between individual selectionists, such as Dawkins[3], and the new-breed of group selectionists, D.S. Wilson[4] or Sober, is well known. Whereas individual selectionists conclude that the number of altruists in a group must decrease, the group selections agree that this is so of isolated groups, but argue that when there are two or more groups with different ratios of altruists to egoists, the total number of altruists in all groups increases.

I suggest that in some important respects the difference between the views of individual and group selectionists is irrelevant, because a third more powerful mechanism in humans,meta-selection, is ai play. What I mean by meta-selection is a higher-leve -selection, such as when a breeder decides which quality ,e.g., altruism or egoism, to breed. If the breeder chooses one orthe other, it is irrelevant whether individual or group selection theory is right

I admit that there is no higher power in human society such as a breeder to do meta-selection. However there is an equivalent power at work, and that is the group as-a-whole. Through group dynamics leadership

emerges which becomes relatively independent and prescribes and forces certain behaviors for the good of the group (as the leadership conceives it), which differ from those the members would manifest were they governed by their own inclinations.

The leadership manages to demand altruistic behavior and gives actual or symbolic social rewards, or promises of future rewards, such as eternal life. But there is always a precarious balance between the leadership and the rest of the group or population. For example, the government demands that its citizens risk their lives in war, but if there were losses in Gulf War as great as those suffered by the Napoleonic army, the government would not survive.

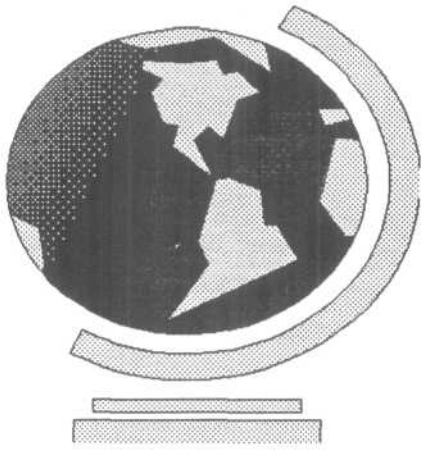
I propose that the leadership has an important role throughout the evolution of humans in social exchange, which is one of the most important aspects of social dynamics. People have a concept and strong interest in balanced exchange, i.e., exchanging equivalent values, and in detecting those who cheat. Leda Cosmides[5] assumes that this is a Darwinian algorithm. I believe it is, even though Cosmides' supporting experiments are not as convincing as she thinks. Almost all people believe in fair or just exchange, but tend to exaggerate the value of their own contributions.

The algorithm of social exchange is pre-programmed by evolution, but who programs the equivalencies of values which are, as is well known, so different at different times and circumstances? Who determines what is fair and just exchange? Here the leadership holds the key role, defining the equivalencies "for the good of the group", but also in such a way as to advantage themselves. For example, in the first great empires rulers were allowed to have 1000 concubines. That was accepted as just and fair, though it was obviously at the expense of 1000 male altruists (as defined by sociobiology), presumably without them being altruistically inclined.

What kind of individuals does the leadership favor? Throughout the ages, It favors those who accept the equivalencies as defined by the leadership, that is, individuals who are flexible to accept what the leadership defines as just and fair. This phenomenon has regressive and progressive features, as the history of Germans in this century shows. Although mostly Christians, the majority was swayed by the Nazi ideology to accept the cruelties of anti-Semitism. To be so flexible, one needs to be endowed with a propensity to repress, with a "social filter" (E. Fromm), which blinds one to the discrepancies in one's beliefs. However, after the War the German nation, as it seems, relatively quickly rejected the Nazi ideology.

In general, those who rebel from the social consensus as defined and enforced by the leadership are minorities on two ends of the spectrum: on the altruistic end are those fighting for the rights of the underprivileged, and on the egoistic end are those who ignore fair exchange or grossly misinterpret it, such as the criminals. The progress of human society rests in flattening the hierarchical pyramid towards a state in which everybody has some influence on defining the social exchange rules, without jeopardizing the welfare of the social system as a whole.

The main point of this essay is to introduce the possibility that group as a whole performs meta-selection. In the highest primates, the evolution has favored group organization and leadership, and in turn the leadership has been in a position to prescribe behaviors "for the good of the group" which nobody would engage in without such leadership. This is reminiscent of Adam Smith's conclusion that an invisible hand transforms actions taken by individuals who are motivated only be desire for their own security and gain into forces that promote social goods that are not intended by the individuals, *c8*



ARTICLE:

by Ferdinand Knobloch
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Mental life as a small social group process - Towards a theory of group schema

Since ASCAP showed such a great interest in Bowlby's "internal working models", you may be interested in a related concept of "group schema", which is less known and older. It was Bacciagaluppi (1993)[1] who drew attention to my group schema concept (1963) as preceding Bowlby's internal working models. I will present the bare bones to you in four points.

1. ROLESCHEMAS. Classifying transferences not only in individual psychotherapy, but in a small therapeutic community which I conceived as an ethological laboratory, I generated 8 categories of roles to which the Subject relates, and called them "role schemas": Male-Female authorities (father.mother, boss, God, gods, goddesses); M-F peers (brothers, sisters, coworkers, friends); M-F subordinates (subordinates, children, pets) and M-F intimate (sexual) partners. We regard knowing a person's typical interactions with these categories of people in different roles as the most important information for psychotherapy. The patient may manifest a self-defeating pattern of behavior towards male authorities (e.g., antagonize unwittingly every boss), but not towards female authorities. The general characteristic of an individual as dominant-or submissive, are not sufficiently informative, since a person can be very submissive and meek towards a boss but at the same time dominant and aggressive towards subordinates. The rich clinical applications of this method are not of primary interest here - they can be found in the book, *Integrated Psychotherapy,* Knobloch, F. & Knobloch, J., (New York: J.Aronson, 1979), or in one of its translations into 4 other languages.

2. INNATE BASIS OF ROLE SCHEMAS. These empirically derived role schemas are more than convenient categorizations. As I found later, they are similar to Harlow's description of the affectional relationships of rhesus moneys, which he organizes into six kinds of love. Secure baby-mother relationships make possible good relationships to peers and that again to later sexual partners and to good parenting. Harlow claims that his list is basically valid for all primates. Role schemas are also likely the kernel of truth that Jung expressed in his archetypes. It seems that although each person's role schemas, forming together group schema, are highly individualized through imprinting and later learning, they are genetically based. People in different roles interact with the help of social releas-ers, not only the mother's breast for the baby, "baby schema"(K. Lorenz), or the shape of the sexual partner's body for the lover, but also the ritualized dominance-submission signals between the alpha male and other chimpanzees. These releasers function with the help of fixed-action patterns, such as ritualized courtships, threat, reconciliation.

3. FUNCTIONS OF GROUP SCHEMA. Group schema, which embrace role schemas and Self-schema, has 3 FUNCTIONS. The first, as indicated already, is that group schema provides a cognitive map that generates predictions that guide our role-relations, often appropriately, but sometimes inappropriately, as exemplified by the behavior of self-defeating individuals. Second, group schema provides a model, a fantasy playground, or virtual reality in which we can practice and seek trial-and-error solutions to our interpersonal problems, without creating real consequences. Dreams and daydreams function as part of this exploring models of reality. Third, Group schema stabilizes mental life, being a source of benefits and costs in fantasy similar to benefits and costs in reality.

How are these benefits and costs generated in reality? Crudely, people exchange goods, services, status, love, information and money. People watch that the exchange is balanced, fair, just, as they try

to avoid being cheated. Leda Cosmides formulated the hypothesis that the social exchange is a Darwinian algorithm and I believe that she is right, though her supporting experiments may not be as convincing as she thinks. Now I believe that social exchange in a modified form regulates also our fantasy life, the virtual reality of our Group schema. Expected rewards and punishments and imagined rewards and punishments are versions of real rewards and punishments.

One is not reprimanded only by one's parents or one's wife, for our role schemas also function as conscience. The deceit of role schemas constitutes the self-deceit, by which we relieve the tensions that accumulate from our failures to fulfill the demands of role schemas. This imagined interpersonal process is what psychoanalysis calls repression, denial, or other defense mechanisms. In this conception, the sociodynamics of the group schema propelled by social exchange covers what in psychoanalysis is called psychodynamics, only this formulation permits empirical testing.

4. DISCUSSION:

Question: What would be the adaptional value of living in a small social group day and night, even when we are alone?

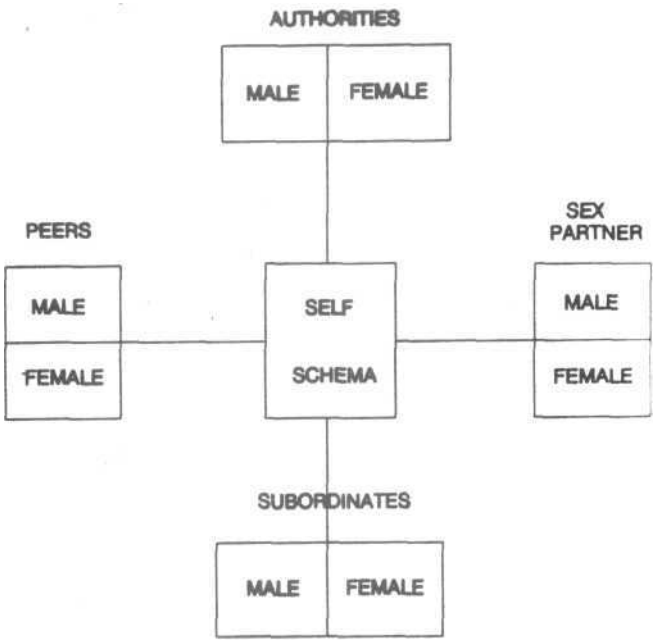
Answer: Most of human life has been lived in small social groups, more than 99% as hunter-gatherers in the Pleistocene era. Most other primates also live in small social groups. The success in group living has become so important for differential survival that it created an evolutionary pressure leading to the development of special cognitive capacities (e.g., intelligence, according to D. Humphrey[2] and others; or an algorithm of social exchange, according to Leda Cosmides[3]; So important is the group, that according to R.I.M. Dunbar[4], there is a correlation between the neocortical volume, size of the group and time spent in social grooming in nonhuman primates.

Small social groups are our natural habitat and people have always interpreted the whole world in terms deriving from them. In many religions, including Christianity, God and the priests are fathers, and gods and goddesses have families, marital and extramarital relations. The old king, president, or Stalin are called fathers. We call our native country either fatherland or motherland. The members of the same church, or political party, or people of the whole world, are brothers and sisters. The myth of universal justice, as studied by Lerner[5], reflects the idea that the whole universe functions as a small social group.

It seems as well, that an important aspect of the arts derives from their allowing one playfully to incorporate into one's group schema elements of the artist's group schema that helped shape his or her work. This is obviously so in literature, but I believe that in other arts also. I reported the evidence that interpersonal processes govern our experience of music in my studies, which were recently summarized in *The ASCAP Newsletter*[6]*. c8*

Group schema consists of Role Schemas:
Self-schema, Authorities M/F, Peers M/F,
Subordinates M/F, Intimate (Sex) Partners, M/F

Table 1



ARTICLE:

Interactive Musings on the EEA: Excerpts from E-mail

From: Jeremy Sherman
hnS215@handsnet.org

In *How to Want What You Have* (Timothy Miller, Ph.D., 1995, Henry Holt) a book touted as the first self-help book written from an evolutionary psychology perspective I find this quote:

There are people who regard obsession with wealth and status as a cultural disease spread by males, heterosexuals, Caucasians, orJudeo-Christians. They point to Native Americans for example, as people who lived in non-competitive, peaceful nonhierarchical society, where wealth didn't count for much. However if you take a closer look at any traditional society, you will find many instances of competition for desirable mates and status, cheating, moral outrage, and sexual jealousy. They competed for wealth status and love just as vigourously as people in industrialized societies. It's less obvious because they often did it in ways unfamiliar to us.

Similarly, in the Moral Animal, Robert Wright writes: *As more and more societies are reevaluated, under the unflattering light of Darwinian anthropobgy, it becomes doubtful that any truly egalitarian human society has ever existed. Some societies don't have sociologists, and thus may not have the concept of status, but they do have status. They have people of high status and low status and everyone knows who is who.*

What is the most comprehensive and substantiated reference for this assertion?

The notion that we have fallen from grace seems archetypical. Adam and Eve did it. Rousseau and the Romantics believed we did it. Now environmentalists do it. Any theories as to why the myth that people were better in the old days tends to resonate with human thinking?

From: John Langdon
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"Any theories as to why the myth that people were better in the old days tends to resonate with human thinking?"

I like this question. As a student I surveyed a variety of Freudian and Jungian explanations for such myths, none of which satisfied me. When we were simple the world was simple. As adults, the world seems endlessly complex; black-and-white is tinged with all shades of gray; and the consequences of our actions become more serious. We all learned what it was like to live in a simple world with simple rules. Simple rules are handed down from parents and from previous generations. Real life requires knowing when to apply the rules and when to bend them.

In a traditional society, one associates that simplicity with the authority of the past. In a progressive society, one associates complexity with the changes observed in a lifetime, and thus simplicity with the past. There fore myths of "good old days" - both traditional and historical ~ resonate with both types of societies.

Interestingly, most other myths are stories of people with more complex problems - the Greek tragedies, for example - that simple prescriptive rules do not solve. Perhaps the important message being taught by Eden myths is not that paradise once existed, but that it no longer does.

From: Lyle Steadman
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Jeremy Sherman asks, are there *"any theories as to why the myth that people were better in the old days tends to resonate with human thinking?"*

Much of what we know (and how to do) comes from the past: our language, our political, economic and

religious behavior, our technical and scientific behavior, all of which has had success in leaving descendants. Thus, praise of "ancestors[1] behavior" has the effect of encouraging respect for, and acceptance of traditions, the basis of human societies. On the other hand, disdain for the "ancestors," or even an emphasis on progress, reduces the willingness to follow traditions. Is it so surprising that the past is often seen as a golden age?

From: Mark Flinn anthmf@mizzou1 .missouri.edu

In regard to the recent string on 'EEA was better' science myths, I like Micheal Alvard's and Ray Hames' analyses of hunting and conservation that debunk the myth of the 'ecologically noble savage.'

Alvard M: Intraspecific prey choice by Amazonian hunters. *Cur Anth* 1995;36(5):789-818.

Alvard MS: Testing the ecologically noble savage hypothesis: Interspecific prey choice by neotropical hunters. *Human Ecology* 1993;21:355-87

Hames R: Game conservation or efficient hunting? In B McKay & J Acheson (Eds): *The Question of the Commons.* Tucson: U Arizona Press, 1987.

From: David Sloan Wilson dwilson@bingsuns.cc.binghamton.edu

Jeremy Sherman's note makes it sound as if the concept of a non-hierarchical society is a big myth and the only interesting question is why people are prone to invent and believe in the myth. I agree that tribal societies have often been romanticized, but there is also a sense in which they really are more egalitarian and non-hierarchical than modern societies. This isn't because the basic desire for status is lacking, but because it is effectively inhibited by other members of small, face-to-face groups. Dominance striving can be so severely punished that the most effective strategy is to actually BE a fair minded fellow who doesn't try to get more than his share - and makes sure that others don't also.

Bruce Knauft and Chris Boehm are two anthropologists who have developed the theme of egalitarianism in hunter-gatherer societies. Both of them are quite sophisticated and aware of the problem of romanticizing so-called primitive life. I provide a couple of key references below and wonder if anthropologists on the network have any opinions to express on their work.

Boehm C: Egalitarian behavior and reverse dominance hierarchy. *Curr Anthrop* 1993;34:227-54.

Knauft B: Violence and sociality in human evolution. *Curr Anthrop* 1991 ;32:391 -428.

From: Scott Wright forestmoss@aol.com

Scott Wright here. On 11/20/95 Jeremy Sherman asked, "Any theories as to why the myth that people were better in the old days tends to resonate with human thinking?"

Traditions, or the way people behaved in the old days, have stood the test of time and have been selected for as being the most successful strategies. Praise for tradition urges people to behave in what has been shown to be a sound manner. Encouraging people to behave in this manner also increases the likelihood for accurate predictions of their behavior which contributes towards cooperation with one another.

Additionally, these myths often incorporate ancestral ties to the main characters of the myth in order to bind obligations of future generations.

A good overview of traditions and ancestors is Steadman & Palmer's "Visiting Dead Ancestors: Shamans as Interpreters of Religious Traditions" *Zygon* 1994 ;29(2):173-189.

From: Gene M. Mesher gene@gas.uug.arizona.edu

Mark, what's the reference on Dunbar's "Group size and memory". Also, are we talking about individual or "group" memories?

I wonder if the "Fall from Grace" myth is so outlandish. As I recall, studies of the Bushmen showed that they were able to work surprisingly small amounts of time to sustain themselves. And current hunters and gatherers are pretty much only found in marginal environments. Furthermore, human beings are adapted for hunting and gathering.

So, while I think that we can only speculate on how the EEA was perceived by contemporary humans, I think that but it may well have been the case both subjectively (how humans felt about living in the EEA) and objectively (C/B of food gathering) that it was a better time, at least compared to many of the subsequent epochs of human existence.

From: Mark Flinn anthmf@mizzou1 .missouri.edu

In response to David's request, I would briefly comment that Boehm's and Knauft's papers are interesting and excellent. However, I would add the caveat that face-to-face contact in small groups may not be an underlying mechanism for apparent egalitarianism (nor group-selective environments).

I think Chagnon's "Is RS equal in egalitarian societies," Betzig's "Despotism and differential reproduction," Dunbar's group size and memory, and equalizing mechanisms such as graduated income tax, military draft, and laws prohibiting polygamy in modem agricultural/industrialized nation states need to be considered in the mix.

A key environmental/historical factor is the development of permanent, heritable resources that can be accumulated and defended by individuals. Most "egalitarian" societies have none; for an Inuit, the 'best place to store meat is in a neighbor's stomach.' No bridewealth or intergenerational resource-based polygyny is possible under such circumstances. Social resources (friendships, alliances) have much more reproductive significance than relatively trivial material items.

But with animal husbandry, storable grain, defensible plots of land suitable for intensive agriculture, large aggregated sedentary populations, and economic specialization, things change. Resource-based polygyny is pervasive. Consider the reproductive practices of Asian emperors discussed by Dickemann and others.

Curiously, the level of egalitarianism (in terms of distribution of reproductive resources) appears to shift back towards equality in modern agricultural nation states.

What complex developmental flexibilities in human psychologies might underlie such variability!

From: Mario Heilmann mheilman@ucla.edu

If humans in the EEA hardly worked, why would a mutant who makes more effort and channels this effort into higher reproductive success not out-reproduce them? For males, this would include either food for offspring or provisioning extra females.

Ordidthey, on average, not work very much, but regularly had some periods of time, where they had to work at full effort. In other words, if they had more offspring, would the extra offspring be sustainable most of the time, but not all the necessary time??

What about idyllic South sea islands. Why do they not immediately get filled to human carrying capacity, so that everyone has a struggle and hard life on an overpopulated island?? It seems that only Easter Island had this fate!?

From: Edward M. Miller emmef@jazz.ucc.uno.edu

Heilman makes some good points about whether the ancestral environment was really as favorable as was argued, and if so what the evolutionary implications were.

One point that might be noted is that most of the "original leisure society" literature draws on tropical people. In temperate and Arctic areas the situation was probably different. *Man the Hunter* includes a chapter on Arctic Eskimos that document heavy death rates from starvation. For Europeans and Orientals during the Ice Ages, the situation was probably more like that in the Arctic today than today's temperate areas.

As many here know, I draw from the evidence that only a few hours were needed to gather enough food, and that women did the gathering that accounted for most calories, that a single mother could feed her children. In such an environment the optimal reproductive strategy would have been a love them and leave them strategy for the males, with male efforts directed not towards provisioning but towards mating effort, some of which may have involved fighting.

In the colder areas Heilman's point about "Or did they, on average, not work very much, but regularly had some periods of time, where they had to work at full effort. In other words, if they had more offspring, would the extra offspring be sustainable most of the time, but not all the necessary time?" makes sense. The winter would be such a period.

I have argued that male efforts at provisioning were essential since hunting large game was a primary strategy for eating during the winter, and females were not suitable hunters (especially when carrying crying babies). Here the male strategy came to be pick a female, bond with her, and provision her.

Heilman has a good point about population expansion, and in the absence of some regulating mechanism (such as warfare or disease) I would expect population to grow to make survival a problem.

Returning to the tropics and the origin myth of an easy life, Mario asks: *If humans in the EEA hardly worked, why would a mutant who makes more effort and channels this effort into higher reproductive success not outreproduce them? For males, this would include either food for offspring or provisioning extra females.*

I suspect the extra effort was made, but I suspect it was not merely gathering extra food since that was not critical to offspring survival or to attracting females (if the food was not critical, I would expect the females to give less weight to provisioning ability and willingness, and more to carrying genes for defeating other males and having sexy sons).

Keeping other males from one's mate or potential mates, and impressing women would be a good use for such time (there may be a link here with the issue of rock musicians attracting females).

For any who have not seen them, my papers expounding this argument can be E-mailed or snail mailed.

Paternal provisioning versus mate seeking in human populations. *Personality and Individual Differences* 1994;17(2):227-255.

Environmental variability selects for large families only in special circumstances: Another objection to differential K theory. *Personality and Individual Differences,* (forthcoming, page proofs approved, probably December issue).

From: Raymond Hames rhames@unlinfo.unl.edu

We have very few good studies of labor time allocation for hunter-gatherers. Based on Sahlins' summary of some Australian data and R. Lee's brief study of the !Kung (both of which can be found in *Man the Hunter)* people claim that foragers work but a few hours per day. The data for such claims is deeply flawed. Some of our members (Kristen Hawkes and Kim Hill) have addressed this issue explicitly and the entire issue is nicely dealt with in Robert Kelly's book *The Foraging Spectrum,* Smithsonian Press, 1995.

As for labor time among hunter-gatherers I calculated that adults worked 6.94 hours/day (Hames R: Time, efficiency, and fitness in the Amazonian protein quest. *Research in Economic Anthropology* 1989; 11:52 table 4). Males work 7.19 hours/day while women work 6.66 (note that the table has an error for it claims that adult labor time is 7.94 but it should really be 6.94). These

figures are calculations based on a sample of four societies all of whom live in either the desert or the tropics. I believe that Kim Hill, somewhere, has bolstered this sample with additions from his Hiwi research and perhaps other sources.

My table cited above shows two trends relevant to leisure in the EEA: (1) hunting and gathering is the only economic formation in which women work less than men (excluding moderns when women don't have jobs outside of the home); and (2) foragers are not the most leisured peoples in the world (that falls to Amazonian and New Guinean horticulturists). However, I would not rely on this small quantitative data set to generalize about life in the EEA.

One of the reasons Lee and Sahlins are able to derive low labor time values for foragers is that they restrict labor time to hunting and gathering and do not count food processing, manufacture, and otherforms of labor that people must do to survive and reproduce. In addition, my tables do not include childcare as a form of labor since this data are very rarely collected. However, if it were to I estimate that, female labor time would increase by an hour and male labor time by about 5-7 minutes per day.

Finally, I would recommend that all who are interested in gaining a picture on the diversity of potential EEA social formations read Kelly's *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways.* Although it has problems, it is by far the best general synthesis of all aspects of foraging life by an author who is strongly influenced by evolutionary ecological theory.

From: Gene M. Mesher
gene@gas.uug.arizona.edu

Ray, thanks for your posting showing that work effort in the EEA may, in fact, not have been so different from those of today. So, I guess the "Garden of Eden" perspective on the EEA may not be one of pure leisure.

Still, time, of course, is only one measure of the actual experience of living. A further point to be made is that the satisfaction which EEA individuals derived from the experience of living in a 'natural' environment may also have been much greater, even if they did work more or less as much as we do today.

I don't know how to measure this very subjective idea, but I do know that in zoos today one of the major efforts is to make the animals' living environment as natural as possible and that they are thought to be much 'happier' as exhibited by less of the 'dysfunctional' behaviors like repetitive pacing, eating their young, etc. I really don't know about the details of this, but present it in hopes that someone else may be able to comment on the idea.

In short, my concept is that living in the EEA was more satisfying for ancestral humans compared to living in subsequent historical environments because it was the optimal fit with our mental capacities and emotion makeup. Rather like having a job you really enjoy, in which case hard work is fun.

From: Henry Harpending **hxh5@psu.edu**

In the 1970's Bushmen were one of the candidates for the Mr. Natural slot, and I can't identify any way in which they found their life in the bush satisfying. Mostly they were hungry.

A troubling aspect of EEA theory to me is the hard-scrabble folks that get cited, like Bushmen or Pygmies or those folks wandering around in the Amazon basin, correspond to what European archaeologists call mesolithic people who were living in dispersed settlements with no more art nor neat technology nor large mammals to eat since they had driven them extinct.

My reading of our history is that we are a brand new species, only 100k years or so old, and that the EEA was short, perhaps heterogeneous, and not of long enough duration to have left much distinctive trace. All the art and decoration and fancy technology associated with the modern human expansion suggests Northwest Coast Indians more than any other group, with women doing most of the food procurement and

with men being macho and fighting with each other all the time. If the human niche is originally one of exploitation of large animals and lots of local raiding and war, then evidence from extant foragers doesn't tell us much at all about Mr. Natural's true nature (except to suggest that foraging is not the right area for our focus.)

From: Renee Pennington
rpenning@ua1vm.ua.edu

Harpending writes that extant foragers dont provide good examples of what life in the EEA may be like. One reason is that all the big game disappeared, so there probably has not been as much to eat in the last 10,000 years. Actually, this may not be true of Africa - there are still huge mammals there (Lambrecht suggests tsetse flies prevented humans from killing them all off).

From: Mark Flinn
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.missouri.edu

I second Henry's comments. Contemporary foragers are in marginal habitats avoiding competition. One would not expect them to (a) be happy about living in difficult environments, and (b) not especially good models for the 'EEA,' if there is such a thing (i.e., a uniform model -I tend to agree with Nesse and Williams' scenario of a highly variable EEA...). I enjoy hot showers, sweet fatty foods, a good bed, my computer, etc. On the other hand, some aspects of modern life may be less than satisfying to our evolved psyches, e.g., infrequent contact with kin, etc. I suspect such novelties are what Gene is thinking of.

From: Scott E. Antes
sea@dana.ucc.nau.edu

On Sat, 2 Dec 1995, Lee Ellis wrote:

My favorite saying about the good old days is: *"Things aren't as good as they used to be, and they never were."* (ellis@warp6.cs.misu.nodak.edu)

Reminds me of a book on the American Family by Stephanie Coontz: *The Way We Never Were: American Families and the Nostalgia Trap.* Basic Books, 1992. (Apologies if someone already has mentioned this; put off some of my mail to read later.)

From: Tim Miller
70611.410@compuserve.com

Tim Miller here, taking another whack at mismatch.

There have been a number of recent posts indicating, wisely enough, that we shouldn't be too glib or presumptuous when speaking of the EEA. In essence, the authors have said that the EEA consisted of a variety of environmental conditions, and probably a variety of cultures. Also, to some degree, many of the details of the EEA are unknown and perhaps unknowable.

Concurrently, it may be hard to discuss mismatch in a rigorous manner because modern conditions are highly variable, and there may be no good way to determine with much rigor, which novel conditions presented by the modem environment are most stressful.

Accordingly, scholars and scientists who want to have successful academic careers might be well-advised to avoid the whole question of mismatch.

Nonetheless, it seems to me that it might be possible to investigate the question of mismatch with some kind of rigor and intellectual integrity.

As a starting point, one might hypothesize that certain features of the EEA were more or less universal, are drastically contradicted in modem life (at least in more industrialized cultures) and are reasonably likely to be stressful, in one way or another.

A provisional and incomplete list might go something like this:

1 - In the EEA, almost everyone lived in relatively small social groups in which everyone knew everyone else By contrast, in the modem world, most people spend

most of their lives surrounded by strangers, or people they do not know well.

2 - In the EEA, social groups (bands? clans? com munities?) were glued together by a complex web of family ties. Most people spent their entire lives assisting ~ or being assisted by -- kin. In modern times, people often live far from their kin, and have such specialized and rapidly-changing needs, skills interests and aspirations that their kin are often unable to help them.

3 - In the EEA, reciprocally altruistic relationships likely persisted over long periods of time and included multiple overlapping forms of assistance. In the modern world, reciprocally altruistic relationships tend to be fewer in number, briefer, and specialized fora particular form of reciprocal assistance (e.g., you and the guy at the next desk assist each other with the mysteries of Windows 95, but if you were hungry and had no place to go, you probably wouldn't call him, nor would he call you).

4 - In the EEA, there was rather little privacy. One didnt low-investment-copulate one's neighbors spouse, unless one was willing to take the social consequences, and perhaps fight to defend one's life. In the same way, stealing, lying and breaking prom ises often had serious social consequences. In the modern era, a great deal of privacy facilitates lying, stealing, cheating, socially unauthorized copulating, and so on.

5 - In the EEA, multiple kin were often available to teach, supervise, protect and socialize children, and had a biological investment in a good outcome, depending upon their degree of kinship. In the modern world, kin are often widely separated for most of all of their lives, which limits their opportunity to teach, supervise, protect and socialize children to whom they are related, and may also limit bonding mechanisms that cause people to become passion ately interested in infants and young children to whom they are related.

6 - In the EEA, paternity uncertainty may have been of less concern, because privacy was harder to come by. Additionally, when paternity was uncertain, many other kin were available to supervise, protect and socialize children who might be neglected by their doubtful or unknown fathers. In the modern era, many fathers may be relatively uncertain of paternity because their wives have much easier access to unobserved extra-pair copulation. Yet, if a father is uncertain of paternity and therefore withholds re-sources from the offspring, the offspring has fewer kin to turn to. As a result, many modern children can depend upon only a small number of adults (some-times only one or none) for biologically-driven altru-ism.

7 - In the EEA, there may have been some occupa tional specialization, but it was not nearly so vast as it is today. Widespread, intense occupational special ization limits the opportunities for reciprocal altruism (because, 1. few people understand how to help you solve your occupation-related problems, and 2. the few people who do understand how to help you solve your occupational problems are likely to be compet ing with you for limited resources). It also limits the opportunities for kin to assist, even if they want to.

8 - In the EEA, there was probably little or no private ownership of land. People tended to stay close to the places they were born, and tended to identify with a particular habitat and a fairly small geographical area. They had intimate knowledge of that particular area. In a vague way, they probably thought it "belonged" to the social group with whom they identified. In the modem world, it is rarely possible to identify with a habitat. If you think of any chunk of geography as "yours" it is probably at most a quarter acre in size. and there is a good chance that it belongs to the bank or the landlord, who can take it away from you under a variety of circumstances.

9 - In the EEA, the piece of geography one identified with was sufficient to provide nearly all of the re sources needed to sustain one's entire social group In the modern world, the piece of geography one identifies with provides few resources other than warmth and shelter. It usually becomes a burden m times of misfortune when income is reduced.

10 - In the EEA, there were relatively few temptations to spend resources foolishly. In some cases, a few food items had to be saved for hungry seasons, and some articles had to be prepared for hunting season, cold season, etc. That was about it. In the modern world, one is constantly assaulted by the temptation to spend resources unwisely, yet the price for doing so is very high.

11 - In the EEA, there was relatively little economic distance between the richest people and the poorest people living in a given habitat. In the modern world, the person in car next to mine on the freeway may be inconceivably richer or poorerthan I am.

12 - In the EEA, there was relatively little educational difference between the most educated people and the least-educated people living in a given habitat. In the modem world, there are vast differences in educational level between people who routinely encounter each other.

13 - In the EEA, suffering from disease, famine, war, drought and other hardships was probably a collec tive affair that affected everyone in one's clan to an approximately similar degree. Consequently, suffer ing was not so often compounded by loneliness as it is in the modem world. In the modem world, home less-ness, hunger, disease, unemployment, and other modern misfortunes tend to be isolating experiences.

14 - In the EEA, "jobs" as we know them today, didn't exist (except, perhaps, for slaves). Neither did "bosses" or "employers," nor did unemployment, disability or retirement. Almost everyone, regardless of age, health, ability or circumstance, probably had something useful to do that was either valued by the clan, that potentially contributed to one's own hope of reproductive success, or both. In the modem age, everyone is in constant danger of becoming "use less" because of age, illness, disability, lack of ability, or lack of opportunity.

15 - In the EEA, no one had employers (except perhaps slaves). If you felt your hunting partner or root-gathering partner was a liar or a bully, you found another partner, or hunted or gathered alone. It was probably unusual to be completely dependent upon a person one detested or mistrusted for one's entire livelihood.

16 - In the EEA, low IQ may have been less socially disadvantageous than it is today. As a result, smart and dumb people might have been able to engage satisfactorily in reciprocal altruism and kin altruism. In the modern world, there is a *de facto,* seldom-recognized three caste system: The very smart (and probably well-educated); people of middling intelli gence and education; and the dumb. Dumb people are often unable to assist smart people. Conse quently, reciprocally altruistic relationships between dumb and smart people become problematic and rare. The dumb tend to envy and resent the smart, and tend to mug them, burglarize their houses, steal their cars and rape their wives and daughters. The smart tend to vote for more and more prisons. This situation creates a toxic atmosphere of fear, envy and hatred that affects almost everyone.

17 - In the EEA, one had a fairly small number of activities from which to choose in any given day (e.g., Should I hunt, rest, or try to seduce my neighbor's wife while he's out hunting?). In the same way, one chose from a fairly small number of life plans (e.g.:, Should I go for one wife or several, an easily acces sible, relatively undesirable wife, or a less accessible, highly desirable wife? Should I be a bully or a cooperator? Should I make war on neighboring villages, or make peace with them?). In the modern world, a middle class person must choose from an almost infinite number of possible activities and life plans. The consequences of choosing badly can be quite harsh. (Right now, for example, writing this message takes time away from several dozen other activities I feel rather strongly I "should" be doing instead. But if I were doing them, I might suspect that
I would be better off thinking and writing about mismatch.)

18 - In the EEA, it was probably pretty easy to distinguish between a desirable mate and an undesir able one. In the modern world, one depends upon a mate in so many subtle, complex and possibly

contradictory ways that it's almost impossible to feel certain that one is making a good choice.

19 - In the EEA, people who lived in the same clan generally agreed with each other on most matters considered crucial for survival and reproductive success. If one missed something, one could easily correct the deficit by asking or observing someone else. In the modern era, almost every crucial question of survival and reproductive success is constantly debated, and it is difficult or impossible to be certain that one is right (e.g.: Should I pray, or is praying a waste of time? Should I get drunk with my friends, or is drinking a stupid, dangerous activity? Should I upgrade to Windows 95 or stick with Windows 3.1 ? [Stick with 3.1.] Should I major in mathematics or chemistry? Should I have children now, or wait until my income is higher and my career is more settled? Etc., etc., etc.).

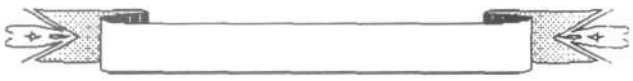
20 - In the EEA, social institutions were quite visible, operated by simple rules, known to all, and tended to administer rewards and punishments quickly. In the modem world, most people know that their fates are tied to the tax laws, the GATT and NAFTA, the Federal Reserve Bank, Child Protective Services, the Congress, the Office of Management of Budget, etc., etc., etc., not to mention the court system, the District Attorney's office, the Public Defender, the civil court system, and so on. But few people, if any, understand all of these institutions adequately. The wheels of these organizations grind slowly and often unpredictably. How many of you swear you will never be ruined by the interest and penalties for an inaccu rate tax return submitted several years previously? How many of you parents can swear that your family will never be destroyed by an overzealous social worker from Child Protective Services?

21 - In the EEA, there were no schools. Children learned essential skills and information by participat ing with their parents in productive activities. Most children had a pretty good chance of learning most essential skills and information, though of course talent was probably unevenly distributed, just as it is today. Today, some children are school-minded, others aren't, according to a wide range of genetic and environmental factors. Children who arent school-minded are at risk for failing to learn essential skills and information.

22 - In the EEA, few potent, addictive substances were easily available. A few people chewed on coca leaves or coffee beans, but in these forms, cocaine and caffeine, respectively, are not very addictive. Beer may have been brewed, but brewing beer required a great deal of time and cooperation among many people, and the alcohol concentration was not high. In the modern world, nearly everyone has access to inexpensive alcohol, nicotine, opioids, amphet amines, cocaine, marijuana, LSD, intoxicating inhalants (e.g. glue, spray paint, etc.), and other equally debilitating substances, in concentrated form. In many cases, these are evolutionarily novel sub stances (or concentrations) for which we have evolved few if any defenses against addiction and self-destruction. We all live in fear of being harmed by someone who is behaving aggressively or irrationally because of intoxication. Every parent fears that their children will become addicted. No married person can be certain that his/her spouse will be untouched.

23 - In the EEA, poisonous substances, plants and animals in one's local environment were generally well known. In the modern world, poisons lurk everywhere. In the soil in your back yard, in the air you breathe, in the water you drink. You can never be certain that you or your children are not being poisoned.

I know that many of these items are debatable to some degree. I know that some of the modern phenomena I describe as generally "bad" might not be all bad. I know that few modern people would choose to live in the manner of the EEA. I also know that it is difficult or impossible to specify the consequences of these differences between the EEA and the modem era with much precision. Nevertheless, aren't these EEA/modern differences, and others like them, worthy of serious and extensive discussion?



ABSTRACTS & EXTRACTS...

Damasio H, Grabowski TJ, Tranel D, Hichwa RD & Damasio AR: A neural basis for lexical retrieval

Nichelli P, Grafman J, Pietrini P, Clark K, Young Lee K & Miletich R; Where the brain appreciates the moral of a story.

Yeh SR, Fricke RA & Edwards DH: The effect of social experienceon serotonergic modulation of the escape circuit of crayfish.

Ag imo A, Villalpando A, Picker Z & Fernandez H: Lesions of the medial prefrontal cortex and sexual behavior in the male rat.

El Mansari M, Bouchard C & Blier P: Alteration of serotonin release in the guinea pig orbito-frontal cortex by selective serotonin reuptake inhibitors.

Lundwall A & Lazure C: A novel gene family encoding proteins with highly differing structure because of a rapidly evolving exon.

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Friedman-Hill SR, Robertson LC & Treisman A: Parietal contributions to visual feature binding: Evidence from a patient with bilateral lesions.

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Szymusiak R: Magnocellular nuclei of the basal forebrain: Substrates of sleep and arousal regulation.

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Wolf ME, Dahlin SL, Hu XT, Xue CJ & White K: Effects of lesions of prefrontal cortex, amygdala or fornix on behavioral sensitization to amphetamine: Comparison with N-methyl-D-aspartate antagonists.

Damasio H, Grabowski TJ, Tranel D, Hichwa RD & Damasio AR: A neural basis for lexical retrieval. Nature 1996;380:399-505.

Abstract: Two parallel studies using positron emission tomography, one conducted in neurological patients with brain lesions, the other in normal individuals, indicate that the normal process of retrieving words that denote concrete entitites depends in part on multiple regions of the left cerebral hemisphere, located outside the classis language areas. Moreover, anatomically separable regions tend to process words for distinct kinds of items.

Nichelli P, Grafman J, Pietrini P, Clark K, Young Lee K & Miletich R: Where the brain appreciates the moral of a story. *Cognitive Neuroscience & Neuropsychology* 1995;6:2309-2313.

Abstract: To identify the distributed brain regions used for appreciating the grammatical, semantic and thematic aspects of a story, regional cerebral blood flow was measured with positron emission tomography in nine normal volunteers during the reading of Aesop's fables. In four conditions, subjects had to monitor the fables for font changes, grammatical errors, a semantic feature associated with a fable character, and the moral of the fable. Both right and left prefrontal cortices were consistently, but selectively, activated across the grammatical, semantic, and moral conditions. In particular, appreciating the moral of a story required activating a distributed set of brain regions in the right hemisphere which included the temporal and prefrontal cortices. These findings emphasize that story processing engages a widely distributed network of brain regions, a subset of which become preferentially active during the processing of a specific aspect of the text.

Yeh SR, Fricke RA & Edwards DH: The effect of social experience on serotonergic modulation of the escape circuit of crayfish. *Science* 1996;271:366-369.

Abstract: The neuromodulator serotonin has widespread effects in the nervous systems of many animals, often influencing aggression and dominance status. In crayfish, the effect of serotonin on the neural circuit for tailflip escape behavior was found to depend on the animal's social experience. Serotonin reversibly enhanced the response to sensory stimuli of the lateral giant (LG) tailflip command neuron in socially dominant crayfish, reversibly inhibited it in subordinate animals, and persistently enhanced it in socially isolated crayfish. Serotonin receptor agonists had opposing effects: A vertebrate serotonin type 1 receptor agonist inhibited the LG neurons in dominant and subordinate crayfish and had no effect in isolates, whereas a vertebrate serotonin type 2 receptor agonist enhanced the LG neurons; responses in all three types of crayfish. The LG neurons appear to have at least two populations of serotonin receptors that differ in efficacy in dominant, subordinate, and socially isolate crayfish.

Agmo A, Villalpando A, Picker Z & Fernandez H: Lesions of the medial prefrontal cortex and sexual behavior in the male rat. *Brain Res* 1995;696:177-186.

Abstract: Lesions of the cerebral cortex near the midline in the frontal region appearing to destroy most of the cingulate cortex and adjacent prefrontal areas had profound effects on male rat sexual behavior. At the first postoperative tests, one week after the lesion, the mount and intromission latencies were extremely long (> 60 min). They continued elevated at every fortnightly test until postlesion week 13, when they were no longer different from controls. However, the proportion of animals that intromitted or ejaculated was reduced at this time. The lesion had a slight effect on the number of intromissions and on the intromission ration, but did not reliably modify other parameters of sexual behavior in those males that copulated after operation. These data suggest that the medial prefrontal cortex is important for the initiation of sexual behavior but less so for its execution. It is proposed that the elaboration and/or interpretation of environmental stimuli are rendered deficient by the lesion. Consequently, sexual behavior is activated only with difficulty. This coincides with the arousal hypothesis proposed by Beach. There appears to exist a spontaneous recovery of the mechanisms responsible for the activation of sex behavior because the lesioned group was not different from the sham or intact groups 13 weeks post-lesion. Remaining cortical tissue or other brain structures may compensate for the initial deficiencies. However, the lesion's effect on intromission behavior did not diminish with time. This could suggest that possible motor deficiencies produced by the lesion are irreversible.

El Mansari M, Bouchard C & Blier P: Alteration of serotonin release in the guinea pig orbito-frontal cortex by selective serotonin reuptake inhibitors. *Neuropsychopharm* 1995;13(2):117-127.

Abstract: Potent serotonin (5-HT) reuptake inhibitors are the only antidepressant agents thus far shown to be effective in the treatment of obsessive-compulsive disorder (OCD). Positron emission tomography studies in humans have implicated the orbito-frontal cortex and the head of caudate nucleus in the mediation of OCD symptoms. Since the delay of the maximal therapeutic effect of selective 5-HT reuptake inhibitors (SSRI) is longer in OCD than in major depression and the terminal 5-HT autoreceptor is not desensitized in the guinea pig frontal cortex after 3 weeks of SSRI administration, the effects of the SSRI paroxetine (10 mg/kg/day) and fluoxetine (5 mg/kg/ day) on 5-HT release and on the sensitivity of the terminal 5-HT autoreceptor were investigated in the guinea pig frontal cortex, the orbito-frontal cortex, and the head of caudate nucleus following a washout period after 3 and 8 weeks of treatment. In preloaded slices prepared from guinea pigs treated with paroxetine for 3 weeks, the electrically evoked release of [^{3}H]5-HT release was enhanced in the frontal cortex (21 %) but not in the orbito-frontal cortex or in the head

of caudate nucleus. However, after an 8-week treatment, the evoked release of [^{3}H]5-HT was significantly enhanced in the orbito-frontal cortex (55%) and in the rest of the frontal cortex (29%) from the same animals, but still unchanged in the head of caudate nucleus. Concentration-effect curves, constructed with the 5-HT autoreceptor agonist 5-methoxytryptamine, showed that the terminal 5-HT autoreceptor was desensitized only in the orbito-frontal cortex after 8 weeks of treatment with paroxetine. Furthermore, the 5-HT transporter was desensitized in the frontal cortex but not in the orbito-frontal cortex. In the case of 3- or 8-week fluoxetine treatment, neither [^{3}H]5-HT release nor the sensitivity of the terminal 5-HT autoreceptor were altered in the orbito-frontal cortex and the head of caudate nucleus. This could be attributable to a smaller degree of 5-HT reuptake inhibition achieved with fluoxetine, in keeping with the notion that higher doses of SSRI are generally required to improve OCD than depression. Taken together, these results indicate that, in the orbito-frontal cortex, the enhanced release of [^{3}H]5-HT induced by prolonged and marked 5-HT reuptake inhibition is attributable to a desensiti-zation of the terminal 5-HT autoreceptor.

Lundwall A & Lazure C: A novel gene family encoding proteins with highly differing structure because of a rapidly evolving exon. *FEBS Letters* 1995; 374:53-56.

Abstract: Despite vast differences in primary structure, it is here shown that several predominant semen proteins are encoded by genes that belong to a common family. Members have their transcription unit split into three exons: the first encoding the signal peptide, the second the secreted protein, while the third exon solely consists of 3' non-translated nucle-otides. The first and the third exon are conserved between members, but the second exon is not. The genes for human semenogelins I and II, rat SCSII, SVSIV, SVSV and guinea pig GP1 and GP2 belong to this gene family.

Hitri A, Hurd YL, Wyatt RJ & Deutsch SI: Molecular, functional and biochemical characteristics of the dopamine transporter: Regional differences and clinical relevance. *Clin Neuropharm* 1994;17(1):1-22.

Summary: The carrier molecule that transports dopamine (DA) across the synaptic membrane is known as the dopamine transporter (DAT). Depending on the ionic conditions, DAT may function as a mediator of both the inward directed DA transport known as the "reuptake" and the outward directed DA transport known as the "release". The functional significance of DAT is in the regulation of DA neu-rotransmission by terminating the action of DA in the synapse via reuptake. With use of DAT binding as a presynaptic marker to measure altered DA innervation, abnormalities of the DAT binding have been demonstrated in idiopathic Parkinson's disease, 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) neurotoxicity, and progressive supranuclear palsy. Moreover, the identification of DAT as the neuronal element that mediates the addictive properties of cocaine highlights its significance in cocaine addiction. Cocaine binding in the brain is heterogeneous, and there is an uneven distribution of the high- and low-affinity binding sites across the anatomical regions. Regional differences in ligand binding are observed by using both [^{3}H]cocaine and the diphenyl-substituted piperazine derivatives known as the "GBR series" of ligands. The identification of compounds that inhibit the binding of cocaine without affecting DA uptake could potentially lead to development of medications for cocaine abuse. Furthermore, clarification of the various binding domains that may be relevant to transporter function in human neuropsychiatric disorders may lead to the development of new medications for schizophrenia, Tourettes disease, and drug addiction.

Russell GW & Arms RL: False consensus effect, physical aggression, anger, and a willingness to escalate a disturbance. *Agg Beh* 1995;21:381 -386

Abstract: The present investigation sought to establish the relationships between two measures of aggression and both subjects' self-reported attraction to fights and likelihood that they would join in a crowd disturbance. Subjects were adult males *(N*= 63) interviewed at an ice hockey game. Tests of the false consensus effect were also undertaken. Physical aggression and anger bore strong, positive correlations with subjects' liking to watch the fights and the likelihood of their escalating a crowd disturbance. Support for the false consensus effect was found insofar as those attracted to the fights and those who would escalate a disturbance estimated a disproportionately greater number of other spectators were similarly attracted to fights and would take similar action. The implications for unruly crowd behaviors were discussed.

Nicoll RA & Malenka RC: Contrasting properties of two forms of long-term potentiation in the hippocampus. *Nature* 1995;377:115-118.

Abstract: Activity-dependent enhancement of synaptic transmission, referred to as long-term potentiation (LTP), is observed at many synapses in the central nervous system. In the hippocampus two distinct forms of LTP have been identified. One involves the activation of the NMDA (N-methyl-D-aspartate) subtype of glutamate receptor and a rise in postsynaptic Ca^{2+}, whereas the other, which is found at mossy fibre synapses, is independent of NMDA receptors but does require a rise in presynaptic Ca^{2+}. Although it is not generally accepted that mossy fibre LTP is expressed presynaptically, the locus of expression for NMDA-receptor-dependent LTP is controversial. Here the two forms of LTP are compared and it is argued that the balance of evidence favours a postsynaptic locus for NMDA-receptor-dependent LTP.

Gabriel SE, Brigman KN, Koller BH, Boucher RC & Stutts MJ: Cystic fibrosis heterozygote resistance to cholera toxin in the cystic fibrosis mouse model. *Science* 1995;266:107-109.

Abstract. The effect of the number of cystic fibrosis (CF) alleles on cholera toxin (CT)-induced intestinal secretion was examined in the CF mouse model. CF mice that expressed no CF transmembrane conductance regulator (CFTR) protein did not secrete fluid in response to CT. Heterozygotes expressed 50 percent of the normal amount of CFTR protein in the intestinal epithelium and secreted 50 percent of the normal fluid and chloride ion in response to CT. This correlation between CFTR protein and CT-induced chloride ion and fluid secretion suggests that CF heterozygotes might possess a selective advantage of resistance to cholera.

Hernandez L & Hoebel BG: Chronic clozapine selectively decreases pref rontal cortex dopamine as shown by simultaneous cortical, accumbens and striatal microdialysis in freely moving rats. *Pharm Biochem & Beh* 1995 ;52(3):581 -689.

Abstract: We used microdialysis to study the acute and chronic effects of clozapine on the metabolism of dopamine (DA) in terminal areas of the mesocortical, mesolimbic, and nigrostriatal systems simultaneously. In the acute experiment, groups of four rats received the following doses: 0 (vehicle), 10,20, and 40 mg/kg of clozapine subcutaneously, which resulted in a dose-related increase in extracellular DA, 3,4-dihydroxyphenalacetic acid (DOPAC), and homovanillic acid (HVA) in the prefrontal cortex (PFC). In the nucleus accumbens (NAC) and striatum (STR), no significant changes were observed at any dose. In the chronic experiment, DA, DOPAC, and HVA were significantly lower in the PFC, and unchanged in the NAC or STR. The 30th clozapine injection failed to increase DA, DOPAC, or HVA in any of the three regions.

We conclude that clozapine acted selectively on the mesocortical systems, and that this may underlie clozapine's therapeutic, antipsychotic effect.

Eblen F& Graybiel AM: Highly restricted origin of prefrontal cortical inputs to striosomes in the Macaque monkey. *J of Neurosci* 1995;15(9):5999-6013.

Abstract: The prefrontal cortex is made up of neocorti-cal areas thought to mediate aspects of the temporal and spatial organization of behavior. One of the prime output targets of the prefrontal cortex is the striatum, which is thought to operate in series with the prefrontal cortex in some neural computations. We have analyzed this prefrontostriatal projection in cynomolgus monkeys by combining anterograde neuronal tract tracing methods with neurochemical markers for the striosome and matric compartments of the striatum. Our results single out two parts of the frontal cortex as projecting densely to the striosome compartment of the striatum: the posterior orbitofrontal/anterior insular cortex and the mediofrontal prelimbic/anterio cingulate cortex. These areas jointly innervated striosomes in the anterior and ventromedial striatum, mainly in the caudate nucleus. Striosomes in the dorsolateral striatum were never labeled. Thus, the anatomical subsystem defined by striosome affiliation includes three cortical and striatal regions that, in humans, have been implicated in obsessive-compulsive disorder. Nearly all of the remaining parts of the prefrontal cortex studies projected preferentially to the matrix compartment. Most of these prefrontal inputs were also patchy, and many of the patches (matrisomes) were selectively paired with nearby striosomes. The highly fractionated organization of prefrontal inputs to striosomes and matrisomes could form a template for computational networks in the striatum that redistribute prefrontal corticostriatal inputs to serve in context-dependent behavioral planning.

Torroni A, Neel JV, Barrantes R, Schurr TG & Wallace DC: Mitochondrial DNA"clock" for the Amerinds and its implications for timing their entry into North America. *Proc. Natl. Acad. Sci.* USA1995;91:1158-1162.

Abstract. Students of the time of entry of the ancestors of the Amerinds into the New World are divided into two camps, one favoring an "early" entry [more than approximately 30,000 years before the present (YBP)], the other favoring a "late" entry (less than approximately 13,000 YBP). An "intermediate" date is unlikely for geological reasons. The correlation of the appropriate data on mtDNA variation in Amerinds with linguistic, archaeological, and genetic data offers the possibility of establishing a time frame for mtDNA evolution in Amerinds. In this paper, we estimate that the separation of the Chibcha-speaking tribes of Central America from other linguistic groups/nascent tribes began approximately 8000-10,000 YBP. Characterization of the mtDNA of 110 Chibcha speakers with 14 restriction enzymes leads on the basis of their time depth to an estimated mtDNA nucleotide substitution rate for Amerinds of 0.022-0.029% per 10,000 years. As a first application of this rate, we consider the mtDNA variation observed in 18 Amerind tribes widely dispersed throughout the Americas and studied by ourselves with the same techniques, and we estimate that if the Amerinds entered the New World as a single group, that entry occurred approximately 22,000-29,000 YBP. This estimate carries a large but indeterminate error. The mtDNA data are thus at present equivocal with respect to the most likely times of entry of the Amerind into the New World mentioned above but favor the "early" entry hypothesis.

Friedman-Hill SR, Robertson LC & Treisman A: Parietal contributions to visual feature binding: Evidence from a patient with bilateral lesions. *Science* 1995;269:853-855.

Abstract: Neurophysiologists have documented the existence of multiple cortical areas responsive to different visual features. This modular organization has spanned theoretical interest in how the "binding problem" is solved. Recent data from a neurological patient (R.M.) with bilateral parietal-occipital lesions demonstrates that the binding problem is not just a hypothetical construct; it can be a practical problem, as rare as the selective inability to perceive motion or color. R.M. miscombines colors and shapes even under free viewing conditions and is unable to judge

either relative or absolute visual locations. The evidence suggests that a single explanation - an inadequate spatial representation - can account for R.M.'s spatial judgment and feature-binding deficits.

Anderson RW: Learning and evolution: A quantitative genetics approach. *J Theor Biol* 1995;175:89-101.

Abstract: Recent models of the interactions between learning and evolution show that learning increases the rate at which populations find optima in fixed environments. However, learning ability is only advantageous in variable environments. In this study, quantitative genetics models are used to investigate the effects of individual learning on evolution. Two models of populations of learning individuals are constructed and analyzed. In the first model, the effect of learning is represented as an increase in the variance of selection. Dynamical equations and equilibrium conditions are derived for a population of learning individuals under fixed and variable environmental selection.

In the second model, the amount of individual learning effort is regulated by a second gene specifying the duration of a critical learning period. The second model includes a model of the learning process to determine the individual fitness costs and benefits accrued during the learning period. Individuals are then selected for the optimal learning investment. The similarities of the results from these two models suggest that the net effects of learning on evolution are relatively independent of the mechanisms underlying the learning process.

Matsuda Y & Fujumura K: Responses of the medial prefrontal cortex to stimulation of the amygdala in the rat: A study with laminar field potential recording. *Neurosci Res* 1995;23:281 -288.

Abstract: Responses generated in the prelimbic-infralimbic cortices (areas 32 and 25) by stimulation of the basolateral amygdala were studied by means of laminar field potential recordings. Based on the analysis of wave forms and depth potential profiles of the responses, three constituent responses were identified: (1) a surface-positive potential with a short onset latency (mean, 4.5 ms) and a long duration (ca. 70 ms) that reversed the polarity at a depth of 400 /vm; (2) a surface-positive potential with a mean onset latency of 15 ms and a duration of 20 ms that reversed to a negative potential at a depth of 300 pm; and (3) a long-latency (ca. 20 ms) superficial-negative potential that reversed to a positive potential at depths below 400 /7m. Lesion experiments ruled out the possibility that impulse traffic *via* the thalamic mediodorsal nucleus (MD) contributed to the responses. Amgydala stimulation also produced responses in the insular cortex, but they did not contaminate the responses in the mesial cortex. It is proposed that impulses originating from the amygdala provide excitation for cortical pyramidal cells at a short latency at deeper layers, but with considerable delays at upper and superficial layers, in the medial prefrontal cortex (mPFC).

Szymusiak R: Magnocellular nuclei of the basal forebrain: Substrates of sleep and arousal regulation. *Sleep* 1995;18(6):478-500.

Summary: Magnocellular regions of the basal forebrain (8F) are recognized as important sites of sleep-wake regulation. Evidence is reviewed for the coexistence within the BF of mechanisms that regulate neocortical and limbic system arousal along with mechanisms that promote sleep. Arousal-related functions are mediated by a system of magnocellular cholinergic neurons. BF cholinergic neurons project monosynapti-cally to the entire neocortex and limbic telencephalon, exert excitatory effects on target **cells** and participate in the regulation of activated EEG patterns characteristic of waking and REM sleep. Evidence suggests that, within the waking state, the BF cholinergic system modulates processing of sensory information in the neocortex and is involved in cognitive processes. One or more noncholinergic cell types are responsible for the sleep-promoting functions of the

BRF. Neurons that display elevated discharge rates during transitions from waking to sleep and during nonREM sleep have been recorded in BF sites where electrical stimulation evokes sleep and experimental lesions cause insomnia. BF neurons function to promote sleep, in part, via descending inhibition of caudal hypothalamic and brainstem activating systems. GABAergic neurons located within magnocellular regions of the BF are hypothesized to mediate sleep-promoting actions. Afferents to the BRF from hypothalamic and brainstem regions are functionally important for sleep-wake regulation. Thermo-sensitive inputs from the anterior hypothalamus modulate the activity of BF sleep- and arousal-related cell types. Excitatory effects of brainstem inputs to BF arousal-related ceils have been documented. Additional evidence supports a critical role for GABAergic-cholinergic interactions, both within the magnocellular BF and at cortical and diencephalic sites, in the regulation of behavioral state.

Haney M, Maccari S, Le Moal M, Simon H & Piazza PV: Social stress increases the acquisition of cocaine self-administration in male and female rats. *Brain Res* 1995;698:46-52.

Abstract: The effect of social stress on the vulnerability to commence cocaine self-administration was examined in Sprague-Dawley rats repeatedly exposed to aggressive attack by a same-sex opponent. Both sexes were studied, since the factors influencing the acquisition of drug self-administration in females have not been defined. Male and female rats encountered an aggressive male or lactating female opponent on four separate occasions over the course of one week. Control male and female rats were not exposed to attack. All animals were implanted with jugular catheters, and six days later placed in to the self-administration box, where a nose-poke in the designated 'active hole' resulted in a 20 *M*l injection of cocaine (0.32 mg/kg). Nose-pokes in an 'inactive' hole had no effect. Male and female rats that had experienced social stress self-administered more cocaine than non-defeated controls. The difference between the stressed and non-stressed animals in the number of cocaine injections was not present during the first few days of exposure to cocaine, but became more pronounced over time. Social stress increased the number of responses for cocaine, but did not alter the number of non-specific responses. Sex differences in self-administration were not significant. Therefore, social status appears to be a potent influence in the onset of drug taking behavior in both male and female rats.

Sherin JE, Shiromani PJ, McCarley RW & Saper CB: Activation of ventrolateral preoptic neurons during sleep. *Science* 1996,271:216-219.

Abstract: The rostral hypothalamus and adjacent basal forebrain participate in the generation of sleep, but the neuronal circuitry involved in this process remains poorly characterized. Immunocytochemistry was used to identify the FOS protein, an immediate-early gene product, in a group of ventrolateral preoptic neurons that is specifically activated during sleep. The retrograde tracer cholera toxin B, in combination with FOS immunocytochemistry, was used to show that sleep-activated ventrolateral preoptic neurons innervate the tuberomammilllary nucleus, a posterior hypothalamic cell group thought to participate in the modulation of arousal. This monosynaptic pathway in the hypothalamus may play a key role in determining sleep-wake states.

Moss SJ, Gorrie GH, Amato A & Smart TG: Modulation of $GABA_A$ receptors by tyrosine phosphory-lation. *Nature* 1995;377:344-348.

Abstract: (Gamma-Aminobutyric acid type-A ($GABA_A$) receptors are the major sites of fast synaptic inhibition in the brain. They are presumed to be pentameric heteroiigomers assembled from four classes of subunits with multiple members: **α** (1-6), β (1-3). y (1-3) and δ (1). Here, with $GABA_A$ receptors consist ing of **α** 1, β1 and y2L subunits, coexpressed in mammalian cells with the tyrosine kinase vSRC (the transforming gene product of the Rous sarcoma virus)

were phosphorylated on tyrosine residues within the y2L and p1 subunits. Tyrosine phosphorylation enhanced the whole-cell current induced by GABA. Site-specific mutagenesis of two tyrosine residues within the predicted intracellular domain of the y2L subunit abolished tyrosine phophorylation of this subunit and eliminated receptor modulation. A similar modulation of $GABA_A$ receptor function was observed in primary neuronal cultures. As $GABA_A$ receptors are critical in mediating fast synaptic inhibition, such a regulation by tyrosine kinases may therefore have profound effects on the control of neuronal excitation.

Wolf ME, Dahlin SL, Hu XT, Xue CJ & White K: Effects of lesions of prefrontal cortex, amygdala orfomix on behavioral sensitization to amphetamine: Comparison with *N*-methyl-D-aspartate antagonists. *Neurosci* 1995;69(2):417-439.

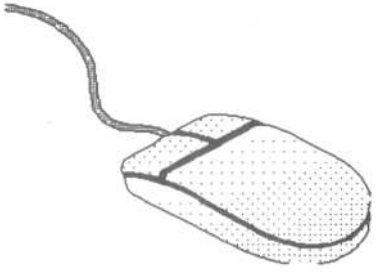
Abstract: Behavioral sensitization to amphetamine involves the mesoaccumbens dopamine system and is accompanied by cellular changes in this system. Excitatory amino acid antagonists, when co-administered with amphetamine, prevent both behavioral sensitization and associated changes in the mesoaccumbens dopamine system. This suggests that excitatory amino acid-dependent events are critical to the initiation of sensitization.

This study sought to identify excitatory amino acid projections required for sensitization, focusing on projections to the nucleus accumbens or ventral tegmental area. The major excitatory projections to the nucleus accumbens originate in the prefrontal cortex, amygdala and hippocampus. The prefrontal cortex and amygdala also send excitatory projections to the ventral tegmental area. Ibotenic acid lesions of the prefrontal cortex or amygdala and electrolytic lesions of the fomix were performed in rats.

After one week of recovery, rats were treated with water or 2.5 mg/kg amphetamine for six days and challenged with amphetamine on day 8. Activity was tested in photobeam cages on days 1 and 8. On day 1, control and sham-lesioned rats exhibited stereotyped behaviors followed by a period of post-stereo-typy locomotion. On day 8, sensitization was evident as an enhancement of both stereotypy and post-stereotypy locomotion. Co-administration of *N*-methyl-D-aspartate antagonists [MK-8001 (dizocilpine male-ate) or CGS19755] with amphetamine prevented the development of sensitization of both stereotype and post-stereotypy locomotion.

Neither antagonist, however, prevented the expression of sensitization. None of the lesions completely mimicked these effects of /V-methyl-D-aspartate antagonists. Lesions of hippocampal projections traveling in the fornix produced a general disinhibition of locomotor activity, but did not prevent sensitization of either stereotypy or post-stereotypy locomotion. Lesions of the prefrontal cortex failed to prevent sensitization of stereotypy, but eliminated sensitization of post-stereotypy locomotion. Lesions of the amygdala produced a significant increase in the intensity of stereotyped behaviors elicited by acute amphetamine, but further sensitization of stereotypy was obtained following repeated amphetamine administration. However, like prefrontal cortical lesions, amygdala lesions prevented sensitization of post-stereotypy locomotion.

When interpreted in the light of previous studies demonstrating the importance of the ventral tegmental area in the initiation of sensitization, the present results suggest a likely role for neuronal circuits involving the prefrontal cortex, amygdala and ventral tegmental area in the development of sensitization of post-stereotypy locomotion following repeated amphetamine administration. Such circuits may initiate sensitization through a mechanism involving excitatory amino acid regulation of the activity of mesoaccumbens dopamine neurons. Parallel circuits, involving other brain regions, may similarly contribute to sensitization of sterotyped behaviors.



AS CITED BY .....

Cover page

[1] Brenner initiated study of C. *elegans,* a worm with the best studied genome in the world. Reference: J.C.: Philip Morris gives institute a head start. *Science* 1996;272:489.

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ACKNOWLEDGMENT. I thank Dr. Kay Stockholder for the language corrections and sharpening the formulation.

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