Human Ethology Bulletin

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SOCIETY NEWS

ISHE World-Wide-Web Server Is On-Line

By Karl Grammer, ISHE Secretary

I began this ISHE electronic bulletin board in March as a supplement to the *Bulletin*. In the test phase which lasted a week, the server had more than 300 visitors.

The server can be reached under this URL: **http://evolution.humb.unvie.ac.at**. For access you need a direct Internet connection and one of the following programs: Mosaic or Netscape; both come in versions for either Windows, MacOs or Unix. You can get both programs for free on the net. We prefer Netscape, because it performs much better than Mosaic. Please set the program up corectly so you will have access to the full service of our server. If you have installed the program, use "open location" and type in the URL above. Access to some pages will be exclusive to ISHE members.

The server will provide the following pages:

ISHE Information: Here you will find a description of ISHE: its history and information on the people running it. From this point you can e-mail to the officers directly, if you have installed your client program correctly. This makes communication with ISHE much easier. We also provide a membership form.

Events: Here we provide information on upcoming and past conferences. If you wish to have something posted, you will have to e-mail it to us. Full information on ISHE conferences will, of course, be provided, including abstracts of past meetings.

Electronic Publications: This is my personal experimental page. There is also a link to Psycholoquy, the first electronic scientific journal. My idea is to publish posters (which have been prepared in electronic form) as pictures, and also figures to accompany journal articles, such as videoclips, 3-D graphs, color pictures, and sounds. These things have been difficult or impossible to publish previously. If there is enough interest, we will provide an electronic journal for behavioural analysis. Have a look at our supplements and videoclips for the digital page image analysis of human courtship. You will also be allowed to download some of the pictures and use them for teaching, etc.

ISHE Archives: The ISHE archives will hold book reviews which have been published in the *Bulletin*. You will be able to search this page, as soon as the search engine is working.

Multimedia: This is a "toy page"; look for surprises. At the moment, the page provides information on research material we are using, videoclips on morphs, and a list of the 100 scientific films of the Human Ethological Film Archive in Andechs (Germany), with information on how to get them. We will expand the film service with a list of

auiovisual materials available to the North American market.

Research and Teaching Tools: This is a collection of commercial, free, and shareware programs for behavioural analysis. On this page ISHE will try to help you in finding the right technical and statitstical programs for behavioural analysis. It provides direct e-mail or FTP links to the sites, programmers or companies that will provide the software. The second half of the page will provide pictures, graphs, and experiment descriptions for behavioural research courses, and so on.

Jumping Stations: This page provides connections to the Animal Behavior Society, and to Newsgroups, and other useful links in behavioural research. If you know of a link, send the URL to us and we will publish it.

Behavior Research: This is our self-presentation page. You will find addresses and descriptions of research institutes in our field (up to now only in Austria). If you want to see your research institute published here, either provide us with the link to your server or send us some photos and a one-page description with your research activities, publications, address, and e-mail. We established this service mainly for students in our field, who often phone us to ask, "Where in the world can I study human behaviour?" There is also an interesting link to our Institute of Human Biology in Vienna. Get news from the "Ice Man" or see the results of new CT methods in research on the evolution of the human skull.

At this point, we do not plan to establish discussion groups, etc. If you are interested in hosting one, please tell us.

I am looking forward to your visits and your contributions! **If you have anything you want to publish, contact us: E-Mail to karl/grammer@univie.ac.at and attach your text, pictures, etc. Alternatively, you can upload directly to our FTP Server: evolution.humb.univie.ac.at. The directory is "Public/Anonymous". Text should be either plain (no carriage returns) or RTF format (use Save as.. in your writing program to create such a document). Pictures should be in GIF or JPEG format. If you cannot do it yourself, simply send the text and pictures to us and we will scan it for you.**

The dates for the 1996 ISHE congress in Vienna, Austria have been set: 5-10 August.

Symposium on Ideology, Warfare and Indoctrinability

This symposium was held at Ringsberg Castle, Germany, 9-13 January 1995. The idea for the symposium came from Irenäus Eibl-Eibesfeldt, ISHE past president. The symposium was sponsored by the Max Planck Society and was organized by Frank Salter, Wulf Schiefenhövel, and Karl Grammer. As a special event, a winter tour in the hills of southern Bavaria was conducted.

Sessions were held on these topics: Evolutionary Precursors and Models (chairs: Detlev Ploog and Lionel Tiger); Institutions, Authority, and Media (chairs: Carmen Strungaru and Roger Masters); Individual Behavioural Mechanisms (chairs: Frank Salter and Linnda Caporeal); Group Formation, Dynamics and Strategies (chairs: Al Somit and Karl Grammer); and Indoctrination and Ethics (chair: Hiram Caton). Forty-five minutes were allotted for presentation and discussion of each paper. In addition, Hiram Caton led a roundtable discussion of the topic "Knowledge of indoctrinability: implications for politics, education and media. A list of papers presented follows:

Byrne, Richard W., University of St. Andrews, Scotland, Imagination and indoctrination: evolutionary origins.

Caporeal, Linnda R. , Dept. of Science & Technology Studies, Rennselaer Polytechnic Institute, Troy, NY 12180 USA, Why the Lysistrata strategy fails: gender identity, group identity and indoctrinability.

Caton, Hiram, Dept. of Political Science, Griffith University, Kessels Road, Brisbaine, Queensland 4111, Australia, Self-indoctrinating groups.

Dennen, Johan van der, Center for Peace and Conflict Studies, University of Groningen, Oude Kijk in 't Jatstraat 5/9, 9712 EA Groninge, The Netherlands, The ethics and politics of peace in preindustrial societies.

Deutsch, Robert, 6092 Old Landing Way, Burke, VA 22015 USA, The primal screen: international relations and indoctrination in the age of TV.

Eibl-Eibesfeldt, Irenäus, Max-Planck-Institut, Von-der-Tann-Strasse 3-5, D-8138 Andechs, Germany, We and the others: familial roots of ethno-nationalism.

Freedman, Daniel G., Committee on Human Development, University of Chicago, 5730 S. Woodlawn, Chicago, IL 60637 USA, Inter-ethnic misunderstanding and the Internal Working Model.

Frey, Siegfried, The formation of prejudice: new facts about an old problem.

Geiger, Gebhard, Institut für Philosophie, Technische Universität München, Lothstrasse 17, D-80290 München, Germany, Ideology, indoctrination and the non-cognitive foundation of beliefs of legitimacy: a biobehavioural analysis of legitimate violent social action.

Grammer, Karl, Ludwig-Boltzmann-Institute for Urban Ethology, Althanstrasse 14, A-1090 Vienna, Austria, Gender advertisement: Erving Goffman revisited.

MacDonald, Kevin, Dept. of Psychology, California State University, Long Beach, CA 90840 USA, Indoctrination and group evolutionary strategies.

Masters, Roger, Dept. of Government, Dartmouth College, Silsby Hall, Hanover, NH 03755 USA, On the evolution of political communities.

McGuire, Michael, Neuropsychiatric Institute and Hospital for the Health Sciences, 760 Westwood Plaza, Los Angeles, CA 90024 USA, Uncertainty and neurophysiological vulnerability to indoctrination.

Ploog, Detlev, Katharinenweg 5, West D-8044 U. Schleissheim, Germany, War and peace-making: the fusion of two neighboring captive monkey colonies.

Quiatt, Duane; Schneider, Shari; & Corbett, Kitty King, Dept. of Anthropology, Campus Box 103, University of Colorado, Denver, CO 800217 USA, The fight to keep cigarette smokers lighting ("Us Tareyton smokers would rather light than fight").

Richerson, Peter, & Boyd, Robert, The cultural evolution of group-"beneficial" traits.

Salter, Frank, Max-Planck-Institute, Von-der-Tann-Strasse 3-5, D-8138 Andechs, Germany, Indoctrination as institutionalized persuasion: further evidence that political ideologies are constrained by species-typical behaviour.

Schiefenhövel, Wulf, Forschungsstelle für Humanethologie in der Max-Planck-Gesellschaft, D-8138 Andechs, Germany, Principles of indoctrination among the Eipo, highlands of West New Guinea.

Schubert, James N., Dept. of Political Science, Northern Illinois University, DeKalb, IL 60115 USA, The role of sex and emotional response in indoctrinability: experimental evidence on the "rally-round-the-flag" effect.

Shnirelman, Victor, Institute of Ethnology & Anthropology, Leninskiy Prospekt 32-A, Moscow 117334, Russia, Who has priority: on the ideology of confrontation.

Somit, Albert, & Peterson, Steven R., Southern Illinois University, Room 256, Lesar Law Bldg., Carbondale, IL 62901 USA (Somit), Indoctrinability as a precondition for democracy.

Sütterin, Christa, Forschungsstelle für Humanethologie in der Max-Planck-Gesellschaft, Von-der-Tann-Strasse 3-5, D-8138 Andechs, Germany, Art and indoctrination.

Tiger, Lionel, 4th floor, 248 W. 23rd St., New York, NY 10011 USA, The interaction of nature and culture and human indoctrinability.

Wiessner, Polly, Forschungsstelle für Humanethologie in der Max-Planck-Gesellschaft, Von-der-Tann-Strasse 3-5, D-8138 Andechs, Germany, Indoctrinability and the two axes of kinship.

ARTICLE

Bonobo Sex and Society: The behavior of a close relative challenges assumptions about male supremacy in human evolution [1]

By Frans B. M. de Waal, Yerkes Regional Primate Center, Emory University, Atlanta, GA 30322 USA.[2]

At a juncture in history during which women are seeking equality with men, science arrives with a belated gift to the feminist movement. Male-biased evolutionary scenarios--Man the Hunter, Man the Toolmaker and so on--are being challenged by the discovery that females play a central, perhaps even dominant, role in the social life of one of our nearest relatives. In the past few years many strands of knowledge have come together concerning a relatively unknown ape with an unorthodox repertoire of behavior: the bonobo.

The bonobo is one of the last large mammals to be found by science. The creature was discovered in 1929 in a Belgian colonial museum, far from its lush African habitat. A German anatomist, Ernst Schwarz, was scrutinizing a skull that had been ascribed to a juvenile chimpanzee because of its small size, when he realized that it belonged to an adult. Schwarz declared that he had stumbled on a new subspecies of chimpanzee. But soon the animal was assigned the status of an entirely distinct species within the same genus as the chimpanzee, *Pan*.

The bonobo was officially classified as *Pan paniscus*, or the diminutive *Pan*. But I believe a different label might have been selected had the discoverers known then what we know now. The old taxonomic name of the chimpanzee, *P. satyrus*--which refers to the myth of apes as lustful satyrs--would have been perfect for the bonobo.

The species is best characterized as female-centered and egalitarian and as one that substitutes sex for aggression. Whereas in most other species sexual behavior is a fairly distinct category, in the bonobo it is part and parcel of social relations--and not just between males and females. Bonobos engage in sex in virtually every partner combination (although such contact among close family members may be suppressed). And sexual interactions occur more often among bonobos than among other primates. Despite the frequency of sex, the bonobo's rate of reproduction in the wild is about the same as that of the chimpanzee. A female gives birth to a single infant at intervals of between five and six years. So bonobos share at least one very important characteristic with our own species, namely, a partial separation between sex and reproduction.

A Near Relative

This finding commands attention because the bonobo shares more than 98 percent of our genetic profile, making it as close to a human as, say, a fox is to a dog. The split between the human line of ancestry and the line of the chimpanzee and the bonobo is believed to have occurred a mere eight million years ago. The subsequent divergence of the chimpanzee and the bonobo lines came much later, perhaps prompted by the chimpanzee's need to adapt to relatively open, dry habitats [see "East Side Story: The Origin of Humankind," by Yves Coppens; *Scientific American*, May 1994].

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[1] The editors of the *Human Ethology Bulletin* requested permission to reprint "Bonobo Sex and Society," by Frans B. M. de Waal, from *Scientific American*, March 1995, Vol. 272, No. 3, pp. 82-88. The text is reprinted with permission from Frans B. M. de Waal and Scientific American, Inc. The *Bulletin* wishes to thank Frans, an ISHE member, and Scientific American for allowing us to reprint this important article without charge. The original article includes some illustrations. To subscribe to *Scientific American*, send $36 per year ($47 non-US) to 415 Madison Ave., New York, NY 10017 USA.

[2] The author and renowned wildlife photographer Frans Lanting are currently working on a richly illustrated book treating the significance of the bonobo for models of human evolution.

In contrast, bonobos probably never left the protection of the trees. Their present range lies in humid forests south of the Zaire River, where perhaps fewer than 10,000 bonobos survive. (Given the species' slow rate of reproduction, the rapid destruction of its tropical habitat and the political instability of central Africa, there is reason for much concern about its future.)

If this evolutionary scenario of ecological continuity is true, the bonobo may have undergone less transformation than either humans or chimpanzees. It could most closely resemble the common ancestor of all three modem species. Indeed, in the 1930s Harold J. Coolidge--the American anatomist who gave the bonobo its eventual taxonomic status--suggested that the animal might be most similar to the primogenitor, since its anatomy is less specialized than is the chimpanzee's. Bonobo body proportions have been compared with those of the australopithecines, a form of prehuman. When the apes stand or walk upright, they look as if they stepped straight out of an artist's impression of early hominids.

Not too long ago the savanna baboon was regarded as the best living model of the human ancestor. That primate is adapted to the kinds of ecological conditions that prehumans may have faced after descending from the trees. But in the late 1970s, chimpanzees, which are much more closely related to humans, became the model of choice. Traits that are observed in chimpanzees--including cooperative hunting, food sharing, tool use, power politics and primitive warfare--were absent or not as developed in baboons. In the laboratory the apes have been able to learn sign language and to recognize themselves in a mirror, a sign of self-awareness not yet demonstrated in monkeys.

Although selecting the chimpanzee as the touchstone of hominid evolution represented a great improvement, at least one aspect of the former model did not need to be revised: male superiority remained the natural state of affairs. In both baboons and chimpanzees, males are conspicuously dominant over females; they reign supremely and often brutally. It is highly unusual for a fully grown male chimpanzee to be dominated by any female.

Enter the bonobo. Despite their common name--the pygmy chimpanzee--bonobos cannot be distinguished from the chimpanzee by size. Adult males of the smallest subspecies of chimpanzee weigh some 43 kilograms (95 pounds) and females 33 kilograms (73 pounds), about the same as bonobos. Although female bonobos are much smaller than the males, they seem to rule.

Graceful Apes

In physique, a bonobo is as different from a chimpanzee as a Concorde is from a Boeing 747. I do not wish to offend any chimpanzees, but bonobos have more style. The bonobo, with its long legs and small head atop narrow shoulders, has a more gracile build than does a chimpanzee. Bonobo lips are reddish in a black face, the ears small and the nostrils almost as wide as a gorilla's. These primates also have a flatter, more open face with a higher forehead than the chimpanzee's and--to top it all off--an attractive coiffure with long, fine, black hair neatly parted in the middle.

Like chimpanzees, female bonobos nurse and carry around their young for up to five years. By the age of seven the offspring reach adolescence. Wild females give birth for the first time at 13 or 14 years of age, becoming full grown by about 15. A bonobo's longevity is unknown, but judging by the chimpanzee it may be older than 40 in the wild and close to 60 in captivity.

Fruit is central to the diets of both wild bonobos and chimpanzees. The former supplement with more pith from herbaceous plants, and the latter add meat. Although bonobos do eat invertebrates and occasionally capture and eat small vertebrates, including mammals, their diet seems to contain relatively little animal protein. Unlike chimpanzees, they have not been observed to hunt monkeys.

Whereas chimpanzees use a rich array of strategies to obtain foods--from cracking nuts with stone tools to fishing for ants and termites with sticks--tool use in wild bonobos seems undeveloped. (Captive bonobos use tools skillfully.) Apparently as intelligent as chimpanzees, bonobos have, however, a far

more sensitive temperament. During World War II bombing of Hellabrun, Germany, the bonobos in a nearby zoo all died of fright from the noise; the chimpanzees were unaffected.

Bonobos are also imaginative in play. I have watched captive bonobos engage in "blindman's buff." A bonobo covers her eyes with a banana leaf or an arm or by sticking two fingers in her eyes. Thus handicapped, she stumbles around on a climbing frame, bumping into others or almost falling. She seems to be imposing a rule on herself: "I cannot look until I lose my balance." Other apes and monkeys also indulge in this game, but I have never seen it performed with such dedication and concentration as by bonobos.

Juvenile bonobos are incurably playful and like to make funny faces, sometimes in long solitary pantomimes and at other times while tickling one another. Bonobos are, however, more controlled in expressing their emotions--whether it be joy, sorrow, excitement or anger--than are the extroverted chimpanzees. Male chimpanzees often engage in spectacular charging displays in which they show off their strength: throwing rocks, breaking branches and uprooting small trees in the process. They keep up these noisy performances for many minutes, during which most other members of the group wisely stay out of their way. Male bonobos, on the other hand, usually limit displays to a brief run while dragging a few branches behind them.

Both primates signal emotions and intentions through facial expressions and hand gestures, many of which are also present in the nonverbal communication of humans. For example, bonobos will beg by stretching out an open hand (or, sometimes, a foot) to a possessor of food and will pout their lips and m ake whimpering sounds if the effort is unsuccessful. But bonobos make different sounds than chimpanzees do. The renowned low-pitched, extended "huuu-huuu" pant-hooting of the latter contrasts with the rather sharp, high-pitched barking sounds of the bonobo.

Love, Not War

My own interest in bonobos came not from an inherent fascination with their charms but from research on aggressive behavior in primates. I was particularly intrigued with the aftermath of conflict. After two chimpanzees have fought, for instance, they may come together for a hug and mouth-to-mouth kiss. Assuming that such reunions serve to restore peace and harmony, I labeled them reconciliations.

Any species that combines close bonds with a potential for conflict needs such conciliatory mechanisms. Thinking how much faster marriages would break up if people had no way of compensating for hurting each other, I set out to investigate such mechanisms in several primates, including bonobos. Although I expected to see peacemaking in these apes, too, I was little prepared for the form it would take.

For my study, which began in 1983, I chose the San Diego Zoo. At the time, it housed the world's largest captive bonobo colony--10 members divided into three groups. I spent entire days in front of the enclosure with a video camera, which was switched on at feeding time. As soon as a caretaker approached the enclosure with food, the males would develop erections. Even before the food was thrown into the area, the bonobos would be inviting each other for sex: males would invite females, and females would invite males and other females.

Sex, it turned out, is the key to the social life of the bonobo. The first suggestion that the sexual behavior of bonobos is different had come from observations at European zoos. Wrapping their findings in Latin, primatologists Eduard Tratz and Heinz Heck reported in 1954 that the chimpanzees at Hellabrun mated *more canum* (like dogs) and bonobos *more hominum* (like people). In those days, face-to-face copulation was considered uniquely human, a cultural innovation that needed to be taught to preliterate people (hence the term "missionary position"). These early studies, written in German, were ignored by the international scientific establishment. The bonobo's humanlike sexuality needed to be rediscovered in the 19 70s before it became accepted as characteristic of the species.

Bonobos become sexually aroused remarkably easily, and they express this excitement in a variety of mounting positions and genital contacts. Although chimpanzees virtually never adopt face-to-face positions,

bonobos do so in one out of three copulations in the wild. Furthermore, the frontal orientation of the bonobo vulva and clitoris strongly suggest that the female genitalia are adapted for this position.

Another similarity with humans is increased female sexual receptivity. The tumescent phase of the female's genitals, resulting in a pink swelling that signals willingness to mate, covers a much longer part of estrus in bonobos than in chimpanzees. Instead of a few days out of her cycle, the female bonobo is almost continuously sexually attractive and active [see "Sex Receptivity.GIF" in the Image File Library].

Perhaps the bonobo's most typical sexual pattern, undocumented in any other primate, is genito-genital rubbing (or GG rubbing) between adult females. One female facing another clings with arms and legs to a partner that, standing on both hands and feet, lifts her off the ground. The two females then rub their genital swellings laterally together, emitting grins and squeals that probably reflect orgasmic experiences. (Laboratory experiments on stump-tailed macaques have demonstrated that women are not the only female primates capable of physiological orgasm.)

Male bonobos, too, may engage in pseudocopulation but generally perform a variation. Standing back to back, one male briefly rubs his scrotum against the buttocks of another. They also practice so-called penis-fencing, in which two males hang face to face from a branch while rubbing their erect penises together.

The diversity of erotic contacts in bonobos includes sporadic oral sex, massage of another individual's genitals and intense tongue-kissing. Lest this leave the impression of a pathologically oversexed species, I must add, based on hundreds of hours of watching bonobos, that their sexual activity is rather casual and relaxed. It appears to be a completely natural part of their group life. Like people, bonobos engage in sex only occasionally, not continuously. Furthermore, with the average copulation lasting 13 seconds, sexual contact in bonobos is rather quick by human standards.

That sex is connected to feeding, and even appears to make food sharing possible, has been observed not only in zoos but also in the wild. Nancy Thompson-Handler, then at the State University of New York at Stony Brook, saw bonobos in Zaire's Lomako Forest engage in sex after they had entered trees loaded with ripe figs or when one among them had captured a prey animal, such as a small forest duiker. The flurry of sexual contacts would last for five to 10 minutes, after which the apes would settle down to consume the food.

One explanation for the sexual activity at feeding time could be that excitement over food translates into sexual arousal. This idea may be partly true. Yet another motivation is probably the real cause: competition. There are two reasons to believe sexual activity is the bonobo's answer to avoiding conflict.

First, anything, not just food, that arouses the interest of more than one bonobo at a time tends to result in sexual contact. If two bonobos approach a cardboard box thrown into their enclosure, they will briefly mount each other before playing with the box. Such situations lead to squabbles in most other species. But bonobos are quite tolerant, perhaps because they use sex to divert attention and to diffuse tension.

Second, bonobo sex often occurs in aggressive contexts totally unrelated to food. A jealous male might chase another away from a female, after which the two males reunite and engage in scrotal rubbing. Or after a female hits a juvenile, the latter's mother may lunge at the aggressor, an action that is immediately followed by genital rubbing between the two adults.

I once observed a young male, Kako, inadvertently blocking an older, female juvenile, Leslie, from moving along a branch. First, Leslie pushed him; Kako, who was not very confident in trees, tightened his grip, grinning nervously. Next Leslie gnawed on one of his hands, presumably to loosen his grasp. Kako uttered a sharp peep and stayed put. Then Leslie rubbed her vulva against his shoulder. This gesture calmed Kako, and he moved along the branch. It seemed that Leslie had been very close to using force but instead had reassured both herself and Kako with sexual contact.

During reconciliations, bonobos use the same sexual repertoire as they do during feeding time. Based on an analysis of many such incidents, my study yielded the first solid evidence for sexual behavior as a mechanism to overcome aggression. Not that this function is absent in other animals--or in humans, for that matter—but the art of sexual reconciliation may well have reached its evolutionary peak in the bonobo. For these animals, sexual behavior is indistinguishable from social behavior. Given its peacemaking and appeasement functions, it is not surprising that sex among bonobos occurs in so many different partner combinations, including between juveniles and adults. The need for peaceful coexistence is obviously not restricted to adult heterosexual pairs.

Female Alliance

Apart from maintaining harmony, sex is also involved in creating the singular social structure of the bonobo. This use of sex becomes clear when studying bonobos in the wild. Field research on bonobos started only in the mid-1970s, more than a decade after the most important studies on wild chimpanzees had been initiated. In terms of continuity and invested (wo)manpower, the chimpanzee projects of Jane Goodall and Toshisada Nishida, both in Tanzania, are unparalleled. But bonobo research by Takayoshi Kano and others of Kyoto University is now two decades under way at Wamba in Zaire and is beginning to show the same payoffs.

Both bonobos and chimpanzees live in so-called fission-fusion societies. The apes move alone or in small parties of a few individuals at a time, the composition of which changes constantly. Several bonobos traveling together in the morning might meet another group in the forest, whereupon one individual from the first group wanders off with others from the second group, while those left behind forage together. All associations, except the one between mother and dependent offspring, are of a temporary character.

Initially this flexibility baffled investigators, making them wonder if these apes formed any social groups with stable membership. After years of documenting the travels of chimpanzees in the Mahale Mountains, Nishida first reported that they form large communities all members of one community mix freely in ever changing parties, but members of different communities never gather. Later, Goodall added territoriality to this picture. That is, not only do communities not mix, but males of different chimpanzee communities engage in lethal battles.

In both bonobos and chimpanzees, males stay in their natal group, whereas females tend to migrate during adolescence. As a result, the senior males of a chimpanzee or bonobo group have known all junior males since birth, and all junior males have grown up together. Females, on the other hand, transfer to an unfamiliar and often hostile group where they may know no one. A chief difference between chimpanzee and bonobo societies is the way in which young females integrate into their new community.

On arrival in another community, young bonobo females at Wamba single out one or two senior resident females for special attention, using frequent GG rubbing and grooming to establish a relation. If the residents reciprocate, close associations are set up, and the younger female gradually becomes accepted into the group. After producing her first offspring, the young female's position becomes more stable and central. Eventually the cycle repeats with younger immigrants, in turn, seeking a good relation with the now established female. Sex thus smooths the migrant's entrance into the community of females, which is much more close-knit in the bonobo than in the chimpanzee.

Bonobo males remain attached to their mothers all their lives, following them through the forest and being dependent on them for protection in aggressive encounters with other males. As a result, the highest-ranking males of a bonobo community tend to be sons of important females.

What a contrast with chimpanzees! Male chimpanzees fight their own battles, often relying on the support of other males. Furthermore, adult male chimpanzees travel together in same-sex parties, grooming each other frequently. Males form a distinct social hierarchy with high levels of both

competition and association. Given the need to stick together against males of neighboring communities, their bonding is not surprising: failure to form a united front might result in the loss of lives and territory. The danger of being male is reflected in the adult sex ratio of chimpanzee populations, with considerably fewer males than females.

Serious conflict between bonobo groups has been witnessed in the field, but it seems quite rare. On the contrary, reports exist of peaceable mingling, including mutual sex and grooming, between what appear to be different communities. If intergroup combat is indeed unusual, it may explain the lower rate of all-male associations. Rather than being male-bonded, bonobo society gives the impression of being female-bonded, with even adult males relying on their mothers instead of on other males. No wonder Kano calls mothers the "core" of bonobo society.

The bonding among female bonobos violates a fairly general rule, outlined by Harvard University anthropologist Richard W. Wrangham, that the sex that stays in the natal group develops the strongest mutual bonds. Bonding among male chimpanzees follows naturally because they remain in the community of their birth. The same is true for female kinship bonding in Old World monkeys, such as macaques and baboons, where males are the migratory sex.

Bonobos are unique in that the migratory sex, females, strongly bond with same-sex strangers later in life. In setting up an artificial sisterhood, bonobos can be said to be secondarily bonded. (Kinship bonds are said to be primary.) Although we now know *how* this happens—through the use of sexual contact and grooming--we do not yet know *why* bonobos and chimpanzees differ in this respect. The answer may lie in the different ecological environments of bonobos and chimpanzees--such as the abundance and quality of food in the forest. But it is uncertain if such explanations will suffice.

Bonobo society is, however, not only female-centered but also appears to be female-dominated. Bonobo specialists, while long suspecting such a reality, have been reluctant to make the controversial claim. But in 1992, at the 14th Congress of the International Primatological Society in Strasbourg, investigators of both captive and wild bonobos presented data that left little doubt about the issue.

Amy R. Parish of the University of California at Davis reported on food competition in identical groups (one adult male and two adult females) of chimpanzees and bonobos at the Stuttgart Zoo. Honey was provided in a "termite hill" from which it could be extracted by dipping sticks into a small hole. As soon as honey was made available, the male chimpanzee would make a charging display through the enclosure and claim everything for himself. Only when his appetite was satisfied would he let the females fish for honey.

In the bonobo group, it was the females that approached the honey first. After having engaged in some GG rubbing, they would feed together, taking turns with virtually no competition between them. The male might make as many charging displays as he wanted; the females were not intimidated and ignored the commotion.

Observers at the Belgian animal park of Planckendael, which currently has the most naturalistic bonobo colony, reported similar findings. If a male bonobo tried to harass a female, all females would band together to chase him off. Because females appeared more successful in dominating males when they were together than on their own, their close association and frequent genital rubbing may represent an alliance. Females may bond so as to outcompete members of the individually stronger sex.

The fact that they manage to do so not only in captivity is evident from zoologist Takeshi Furuichi's summary of the relation between the sexes at Wamba, where bonobos are enticed out of the forest with sugarcane. "Males usually appeared at the feeding site first, but they surrendered preferred positions when the females appeared. It seemed that males appeared first not because they were dominant, but because they had to feed before the arrival of females," Furuichi reported at

Strasbourg.

Sex for Food

Occasionally, the role of sex in relation to food is taken one step further, bringing bonobos very close to humans in their behavior. It has been speculated by anthropologists--including C. Owen Lovejoy of Kent State University and Helen Fisher of Rutgers University--that sex is partially separated from reproduction in our species because it serves to cement mutually profitable relationships between men and women. The human female's capacity to mate throughout her cycle and her strong sex drive allow her to exchange sex for male commitment and paternal care, thus giving rise to the nuclear family.

This arrangement is thought to be favored by natural selection because it allows women to raise more offspring than they could if they were on their own. Although bonobos clearly do not establish the exclusive heterosexual bonds characteristic of our species, their behavior does fit important elements of this model. A female bonobo shows extended receptivity and uses sex to obtain a male's favors when--usually because of youth--she is too low in social status to dominate him.

At the San Diego Zoo, I observed that if Loretta was in a sexually attractive state, she would not hesitate to approach the adult male, Vernon, if he had food. Presenting herself to Vernon, she would mate with him and make high-pitched food calls while taking over his entire bundle of branches and leaves. When Loretta had no genital swelling" she would wait until Vernon was ready to share. Primatologist Suehisa Kuroda reports similar exchanges at Wamba: "A young female approached a male, who was eating sugarcane. They copulated in short order, whereupon she took one of the two canes held by him and left."

Despite such quid pro quo between the sexes, there are no indications that bonobos form humanlike nuclear families. The burden of raising offspring appears to rest entirely on the female's shoulders. In fact, nuclear families are probably incompatible with the diverse use of sex found in bonobos. If our ancestors started out with a sex life similar to that of bonobos, the evolution of the family would have required dramatic change.

Human family life implies paternal investment, which is unlikely to develop unless males can be reasonably certain that they are

Social Organization among Various Primates

BONOBO

Bonobo communities are peace-loving and generally egalitarian. The strongest social bonds are those among females, although females also bond with males. The status of a male depends on the position of his mother, to whom he remains closely bonded for her entire life.

CHIMPANZEE

In chimpanzee groups the strongest bonds are established between the males in order to hunt and to protect their shared territory. The females live in overlapping home ranges within this territory but are not strongly bonded to other females or to any one male.

GIBBON

Gibbons establish monogamous, egalitarian relations, and one couple will maintain a territory to the exclusion of other pairs.

HUMAN

Human society is the most diverse among the primates. Males unite for cooperative ventures, whereas females also bond with those of their own sex. Monogamy, polygamy and polyandry are all in evidence.

GORILLA

The social organization of gorillas provides a clear example of polygamy. Usually a single male maintains a range for his family unit, which contains several females. The strongest bonds are those between the male and his females.

ORANGUTAN

Orangutans live solitary lives with little bonding in evidence. Male orangutans are intolerant of one another. In his prime, a single male establishes a large territory, within which live several females. Each female has her own, separate home range.

caring for their own, not someone else's, offspring. Bonobo society lacks any such guarantee, but humans protect the integrity of their family units through all kinds of moral restrictions and taboos. Thus, although our species is characterized by an extraordinary interest in sex, there are no societies in which people engage in it at the drop of a hat (or a cardboard box, as the case may be). A sense of shame and a desire for domestic privacy are typical human concepts related to the evolution and cultural bolstering of the family.

Yet no degree of moralizing can make sex disappear from every realm of human life that does not relate to the nuclear family. The bonobo's behavioral peculiarities may help us understand the role of sex and may have serious implications for models of human society.

Just imagine that we had never heard of chimpanzees or baboons and had known bonobos first. We would at present most likely believe that early hominids lived in female-centered societies, in which sex served important social functions and in which warfare was rare or absent. In the end, perhaps the most successful reconstruction of our past will be based not on chimpanzees or even on bonobos but on a three way comparison of chimpanzees, bonobos and humans.

FURTHER READING

THE PYGMY CHIMPANZEE: EVOLUTIONARY BIOLOGY AND BEHAVIOR. Edited by Randall L. Susman. Plenum Press, 1984.

THE COMMUNICATIVE REPERTOIRE OF CAPTIVE BONOBOS (*PAN PANISCUS*) COMPARED TO THAT OF CHIMPANZEES. F.B.M. de Waal in "Behaviour," Vol. 106, Nos. 34, pages 183-251; September 1988.

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CHIMPANZEE CULTURES. R. Wrangham, W. C. McGrew, F.B.M. de Waal and P. Heltne. Harvard University Press, 1994.

FRANS B. M. de WAAL was trained as an ethologist in the European tradition, receiving his Ph.D. from the University of Utrecht in 1977. After a six-year study of the chimpanzee colony at the Arnhem Zoo, he moved to the U.S. in 1981 to work on other primate species, including bonobos. He is now a research professor at the Yerkes Regional Primate Research Center in Atlanta and professor of psychology at Emory University.

Response to the Review by James H. Fetzer of *Animal Minds* by Donald Griffin (Sept. 1994 *Newsletter*)

By Nancy E. Aiken, P. O. Box 27, Guysville, OH 45735 USA.

If it is, indeed, the case that cognitive ethology is built upon two opposing views of behavior--the "common-sense" view that animals make deliberate choices, and the "behavioristic" view that cognitive processes have no effect on behavior--then it seems that cognitive ethology is built upon two not only opposing, but very simplistic, views. Ethological literature certainly does not support the notion that these are the only possible views of animal and human behavior. Griffin, of course, wisely suggests alternatives. One of these possibilities is that cognition can occur without consciousness of that cognition. Studies of the operations of the emotions and other behaviors associated with precortical brain activities certainly support this alternative.

Griffin goes further to suggest that animals also possess different levels of consciousness: perceptual and reflective. Of course, humans experience reflective consciousness, but Griffin suggests that some other animals do too. A nicely developed cortex would provide the physical structure for reflective consciousness--just how much development is needed for reflective

consciousness is probably the question.

Fetzer suggests that cognition is built upon signs and that various behaviors are activated by the presence of different kinds of signs. For example, an alarm call will cause other animals of the group to seek safety. Fetzer further suggests that distinctions can be drawn among different types of "minds" by their reactions to different kinds of signs. Type I minds can process signs that look like what they stand for, e.g., light and dark. Type II minds can process and make use of signs that are causes or effects for the things for which they stand, e.g., a fly will help satisfy a toad's hunger. Type III minds can process signs that are conventions associated with that for which they stand, such as (and this Fetzer's example) words in a language.

Perhaps I have misunderstood but it seems a large jump from type II minds to type III minds. Reducing cognition to types I-III is too limiting. Using Fetzer's sign model to study cognition has possiblities, however, and can (as Fetzer suggests) be superimposed on Griffin's ideas about types of consciousness.

The philosopher David Hume wrote that all we know is what we know from our senses; we can only assume cause and effect. Thus, if Hume was right, we human beings have type I minds. However, when Hume discussed "knowing" he did not mean simple perceptual awareness as Griffin and Fetzer mean, but knowing in the sense of knowing things such as how God works, what is the universe, and what is justice, love, etc. Hume thought big. Much confusion results, however, from different meanings of words. Knowing is such a word, and consciousness is such a word. As Fetzer points out, saying an animal is conscious of its behavior does not necessarily mean that the animal is reflecting upon its behavior, but only that it realizes that it is behaving. Other terms such as mind, awareness, cognition, mentality, and thinking need to be clarifed if substantial progress is to be made in the area of animal cognition.

Another concern that should be addressed relates to Hume's assessment that we (human beings) can never "know" anything because we have only our senses to provide us with information. He meant that since we cannot hear God, see God, taste God, feel God, or smell God, we cannot know Him. That seems true enough, but not knowing God in the perceptual sense does not preclude our knowing other things in the perceptual sense. Furthermore, Hume added that since we do not perceive cause and effect, we cannot know the cause and effect relationship. Kant reacted to Hume's conclusion by proposing that synthetic a priori knowledge answers the question of how people can "know" cause and effect. However, his suggestion and explanation of synthetic a priori knowledge has never been completely understood. Perhaps he could have explained it more clearly if he had had ethological studies to use as examples.

This last notion has already been explored by Michael Ruse (1985) in a book edited by Fetzer, *Sociobiology and Epistemology*. In his chapter, Ruse suggests looking at synthetic a priori knowlege in light of E. O. Wilson's description of epigenetic rules. Whereas Kant might say that synthetic a priori knowledge makes cause and effect necessary, Wilson would probably argue that knowing cause and effect is adaptive. Ruse points out that the key difference in the Kantian and Wilsonian viewpoints is that Kant would find cause and effect "immutable" but Wilson would see other possibilities depending on the evolution of the species in question. Philosophical epistemology might explore this notion of knowledge relative to species as a means of clarifing what we, as human beings, know. (This idea is being explored in a paper currently being prepared for publication by myself and two others.) This notion might also open the field of cognitive ethology to a comparative approach realizing the possibility that knowledge is relative to the evolutionary forces which have developed the creature under study whether it be man, goldfish, spider, or worm.

While Fetzer's sign model may work as a means of forming a comparative approach to cognitive ethology, it is important to avoid anthropomorphising the knowledge of nonhuman creatures. We need to somehow place ourselves in their positions in order to arrive at a viewpoint of their worlds as objectively as it is possible. In the same way, it is important to differentiate spider knowledge from cat knowledge, etc. That is, it seems important to not only differentiate by types of "minds" but to remember to look at the evolutionary forces behind those "minds."

Getting back to the issue of types of signs and minds, an investigation of cognitive ethology (and epistemology) should consider the effects of "sign stimuli," or "releasers." The releaser concept has changed since the days of Lorenz and Tinbergen. [I outline these changes in my dissertation, *A Biological Basis for the Emotional Impact of Art* (Ohio University, 1992).] This type of sign is not alluded to by Fetzer but is similar to the type III sign. However, the association is not through convention but through biology. The releaser's effect on behavior is to cause the behavior without the animal's awareness. The importance of this type of sign cannot be underestimated, especially for us human beings who are apt to think that we are aware of every cause and every effect.

Another type of sign that may have importance only for human beings is the artistic "sign" which can probably best be explained as work stands for something that is neither conventional nor biological but a subtle mixture of both. The kind of mind that can utilize this type of sign must be able to make metaphorical leaps.

Fetzer's review of Griffin's book was quite interesting. Perhaps the suggestions offered above will be of some value; it seems that we all need to look around at other disciplines in order to broaden our views of our own specialities. An evolutionary viewpoint applied to any discipline seems to open many doors to a global perspective capable of solving and resolving many heretofore vexing problems.

Reference

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Newsletter Submissions

Anything that might be of interest to ISHE members is welcome: Society matters; articles; replies to articles; suggestions; announcements of meetings, journals or professional societies; etc. These sorts of submission should be sent to the editor. Book review inquiries should go to the appropriate book review editor (the British editor covers English-language books published in Europe). Submission should be in English, on paper and, if possible, also on diskette (WordPerfect preferred). Shorter reviews are preferred (less than 1000 words). Please include complete references for all publications cited. For book reviews, please include publisher's mailing address and the price of hardback and paperback editions. There usually is not time to consult with reviewers about editorial changes, but most of these are minor.

Newsletter submissions are usually reviewed only by the editorial staff. However, some submissions are rejected. Political censorship is avoided, so as to foster free and creative exchange of (even outrageous) ideas among scholars. The fact that material appears in the newsletter never implies the truth of those ideas, ISHE's endorsement of them, or support for any policy implications that may be inferred from them.

Festschrift for Dan Freedman

The American Psychological Association will sponsor a Festschrift to honor Daniel G. Freedman. Dan is retiring from his professorship at the Committee on Human Development of the University of Chicago, but continues to conduct research. The conference is entitled "Genetic, Ethological and Evolutionary Perspectives on Human Development."

The event will take place from 7PM Fri., 27 October to 1 PM Sun., 29 October 1995 at the University of Chicago. It should be of interest to a wide range of human ethologists. The scheduled speakers are: J. Michael Bailey, Jerome H. Barkow, Nicholas G. Blurton Jones, Irenäus Eibl-Eibesfeldt, Paul Ekman, Irving I. Gottesman, Roger Levesque, Robert LeVine, Robert Marvin, Ritch Savin-Williams, J. Paul Scott, Nancy L. Segal, Robert Trivers, Carol Weisfeld, Glenn Weisfeld, and Peter Wolff. Nancy, our Membership Chair, is principal organizer of the conference. The conference will include film presentations, a reception the first evening, time allotted for audience

Membership Renewals for 1995

It is time to renew your membership for 1995 if you have not already done so. Membership is by calendar year, so dues are to be paid by the first of the year. **If the date on your mailing label is earlier than the current year, it is time to renew your membership.** For financial reasons, renewal notices are not usually sent. Those who do not renew their memberships will be removed from the membership list. **Please report errors, changes of address, etc. to the treasurer.** Current dues and directions for payment are given on the last page. Please allow four weeks for recording changes of address or payment of dues.

participation, a session for graduate students and post-doctoral fellows at which the participants will have reprints available and will be present to discuss their work informally, and a concluding round-table discussion on future research possibilities and career opportunities.

Registration (preferably by 15 Oct.) is $25 ($15 for students and post-doctoral fellows). Please send registration to Betty Cawelti (ATTN: FEST), University of Chicago, Committee on Human Development, 5730 S.Woodlawn, Chicago, IL 60637 USA, fax 1-312-702-0320. Credit card payment is acceptable (but not by fax). Include address, phone, fax, and E-mail numbers.

Please make your own hotel arrangements. The conference hotel is the Ramada Lake Shore, 4900 S. Lake Shore Dr., Chicago, IL 60615, tel. 1-312-288-5800, fax 1-312-288-5745. Ask for Bette Hunt and the rooms reserved for the "Freedman Conference". Single rooms are $73 per night, doubles $83. Some dormitory rooms on campus may be available for about $35 at International House, 1414 E. 59th St., Chicago, IL 60637 USA, tel. 1-312-753-2270, fax 1-312-753-2310.

For additional information or to receive a flyer suitable for posting, contact Nancy Segal at 1-714-773, 2142, fax 1-714-449-7134, E-mail nsegal@fullerton.edu or Glenn Weisfeld. Dan is currently at P. O. Box 959, Las Vegas, NM 87701, tel. 1-505-421-2715.

BOOK REVIEWS

The Bell Curve

By Richard J. Herrnstein and Charles Murray. The Free Press, 866 Third Ave., New York, NY 1994. Pp. 845; $30.00 (hdbk).

Reviewed by Barbara Hollar, Dept. of Biology, University of Detroit Mercy, Detroit, MI 48219 USA.

The Bell Curve is thought provoking but ultimately flawed. Its errors invalidate the sweeping conclusions claimed for it by its authors, but other facets of the book are provocative and deserve public discussion.

In brief, Herrnstein and Murray contend that having a high IQ enables one to obtain education and employment in a highly technological society, while having a low IQ predisposes one to unemployment, poverty, welfare dependency and crime. They support their hypothesis with data showing the distribution of IQ scores among various socioeconomic, racial and ethnic groups. They then argue that since the IQ distributions are genetically
determined and are resistant to environmental change, the gap between the affluent cognitive elite and the intellectually and economically impoverished will grow. In a chapter entitled "The Way We Are Headed", they predict a caste system in Americawith the federal government running a "custodial state" in which the underclass is kept out of sight and out of mind. According to Murray and Herrnstein, "we have in mind a high-tech and

more lavish version of the Indian reservation for some substantial minority of the nation's population, while the rest of America tries to go about its business" (p. 526).

While one might think that the whole idea might be inflammatoryenough to start several advocacy groups afire, in fact public discussion thus far has seemed to focus on the part of the book that deals with genetics, IQ, and race (Chapter 13). Not only is this the most politically volatile issue in the book, it highlights the weakest link in their argument. Herrnstein and Murray misunderstand the concept of heritability. They have committed a fundamental error in the use of heritability measures that anyone who has taken a college level course in genetics would recognize immediately. Since many otherwise well informed readers know little about genetics, public reaction in the media has been to discuss the ethics of broaching the topic rather than to analyze the argument itself.

Let me illustrate why their analysis is incorrect. Heritability is defined as the proportion of the total variance in a trait (phenotypic variance) that is due to genetic variance. It ranges from zero (no genetic influence) to one (all of the variation in the trait is due to genetics). Heritabilities measured in one place at one point in time are valid only for that set of conditions and cannot be extrapolated from one population to another. An example will serve to demonstrate the rationale behind this "rule". Suppose you take a handful of genetically similar corn seeds and plant them in a greenhouse under carefully controlled conditions. When the plants mature, there will be variation in height which you can graph as a bell curve. If you measure heritability in this population, you will find it to be very high, meaning that the environment (which was held constant) had little to do with plant height and genetics accounts for most of the variation. Now suppose you could take the very same corn and plant it outdoors. Some seeds will have optimum growth conditions but others will fall in a shady spot or on rocky soil. When you measure the variation in height of the mature plants, you will get a bell curve again, albeit probably one with a larger variance than in the greenhouse example. But this time, when you do the heritability calculations, you find that heritability is low. The variation in height is due more to the differing microenvironments than it is to genes. But the genes in the seeds are exactly the same in the two examples.

Murray and Herrnstein's error is to have assumed that heritability is a fixed value. Even worse, they have arrived at the heritability estimate that they use throughout the book by determining a "middle-ground estimate" taken from many different studies of heritability. This is roughly akin to a climatologist averaging today's temperatures in London, New Delhi, and Melbourne and declaring 60 degrees to be the world temperature useful in any climate model.

Even the reasons for pursuing the analysis of heritability are unclear. If Herrnstein and Murray had data to show that the heritability of IQ in both blacks and whites were 1.0, the **differences** in the IQ distributions between the races could still be environmental. Furthermore, heritability measurements do not enable one to predict what would happen in an entirely new environment. The heritability of stature in people has been high in every study done, but over the last century average height has increased dramatically. It is possible for heritability to be high in the old environment and in the new environment while the trait still changes substantially. In short, the prediction that we will have a heritable caste system based on the genetics of IQ is unsubstantiated.

If the analysis of heritability is incorrect, are there any other reasons for recommending the book? This certainly is not a book that I would recommend to the casual reader. The prose is dense, and the text is thick with data even for readers in the "cognitive elite" who are accustomed to journal reading. However, if you are willing to persevere, there is a great deal of data that is relevant to current political discussions of education, welfare and affirmative action.

Part I of the book is an examination of the group of people Herrnstein and Murray term the "cognitive elite". (Those of you reading

this are certainly members of this group.) People with high cognitive abilities, regardless of socioeconomic status, will attend college and become employed in a relatively small number of professional occupations which pay well in comparison to the average job. The authors argue that this partitioning by IQ and occupation will continue and that the "cognitive elite" will become increasing isolated from other Americans. The assumption is that this group is likely to become richer and more powerful as others struggle to make ends meet. How convincing this argument is depends upon whether or not you believe that recent trends in employment are likely to continue. Derek Bok's book, *The Cost of Talent* (1993), analyzes this issue in detail and would be a valuable supplement while reading Herrnstein and Murray.

The analyses of social concerns such as poverty, crime, unemployment, and welfare dependency with regard to IQ are enlightening. The unspoken assumption in our culture is that these problems are in large part due to a background of low socioeconomic status. Herrnstein and Murray show that low IQ is a much stronger predictor of poverty and unemployment than is socioeconomic background. Their analysis of the National Longitudinal Study of Youth showed that three-fourths of the white women on welfare after the birth of their first child came from the bottom quartile of IQ. This has profound public policy implications. Proponents of welfare reform are proposing mandatory job training for welfare recipients. Job training programs involve teaching skills that employers find desirable. If, in fact, many of the people on welfare are incapable of attaining this level of competence, reform could be an expensive mistake.

Finally, the authors tackle the issue of affirmative action. Regardless of your opinion on the matter, you will find their analysis interesting. The authors clearly trace the history of affirmative action from its legislative beginnings through subsequent court and executive decisions to its present form, and then analyze whether or not present policies have had the desired effect. Not surprisingly, they favor reforming affirmative action so that people with equal intellectual abilities have equal job opportunities regardless of their ethnic group.

Taken as a whole, this is not a book that I can recommend. While individual chapters have merit (particularly those showing links between low intelligence and the tendency to drop out of school or to end up on public assistance), the overall argument that a hereditary underclass is forming does not hold up. While few would dispute the claim that genes have an effect on nervous system development, no one knows which genes are involved, how many genes are involved, or how those genes are distributed in the population. Given that, it is presumptuous in the extreme to suggest that class structure in America is a result of the genetics of IQ.

While I agree with those who say that Herrnstein and Murray's ideas should be within the the realm of public debate, I hope that while we are debating we do not lose sight of the measures such as prenatal care and infant nutrition that we know to be effective in preventing some cases of subnormal intelligence.

Reference

Bok, D. *The Cost of Talent*. New York: The Free Press, 1993.

Nature's Mind: The Biological Roots of Thinking, Emotions, Sexuality, Language, and Intelligence

By Michael S. Gazzaniga. Basic Books, 10 E. 53rd St., New York, NY 10022, USA, 1992, $25 (hdbk.).

Reviewed by Linda Mealey, Psychology Department, College of St. Benedict, Collegeville, MN 56321 USA.

This is a book that, in my estimation, is mistitled. I'm guessing that the title was designed to appeal to a broad, lay audience, but I expect the result is that it will not be read by as many academics as it should. Gazzaniga's

book is not just any other pop psych or pop bio book. In fact, despite the subtitle, there is nothing in the book on emotion or sexuality. The book is really about the role of selection in the ultimate expression of mind--not just the role of natural selection in designing our species' brain, but selection at the level of cells and neural circuits whose tailoring can give rise to hundreds of thousands of different phenotypes, expressed as individual minds. As such, it is the first of what will likely be a stream of popular books on this subject.

The introduction, entitled "Selection versus Instruction," puts proposes that the brain is not plastic in any of the ways previously thought. It is not a tabula rasa, nor clay to be molded, nor even a profusion of neurons awaiting environmental input in order to form their eventual adult circuitry. Rather, it consists of a plethora of pre-wired circuits available to respond to a variety of environmental contingencies. Through cell death and the selective retention of certain circuits over others, an individual's particular brain and mind is selected from the many possible minds encoded in the original genotype and phenotype.

Although we have known about perinatal neuronal death for decades, the interpretation of this phenomenon as a selection process is fairly new and has many profound implications. Theoretically, this view allows a reconciliation of the functionalist view of the brain as a set of pre-determined and independent cognitive modules (Fodor, 1981) with the interactionist view that acknowledges the apparent role of "learning" in development. It is also compatible with (but not identical to) the "Neural Darwinism" of Gerald Edelman (1987, 1992). Practically speaking, this view leads to a change in our conception of the mechanics of learning and the role of environmental input in that process.

Chapter 1 and 2 are, respectively, an explanation of the model based on an analogy to the immune system, and an application of the model to the well-known work on the plasticity of the visual system. These two chapters are accessible (I was unable to get through the Edelman books because of their technical difficulty), and fundamental--definitely worth reading.

On the other hand, I am not as enthusiastic about the rest of the book. Subsequent chapters--on the development of cognition, language, intelligence, consciousness, addictions and compulsions, psychoanalysis, and health care--are increasingly distant from the thesis, and increasingly disjointed in style. Only if one is already familiar with the basic research of a given chapter will the connection to the selection model be at all evident. There is, however, no need to read all of the chapters nor to read them sequentially. I would suggest reading only the one or two most relevant to one's own field, to get an idea of how selection theory may affect that field in the next few decades.

I might also mention that the book utilizes what is becoming an increasingly common form of referencing that I am very unhappy with: The text contains vague references to particular authors, without a reference number or a date. Instead, the numbers refer to footnotes at the back of the book which point the reader to "suggested readings". Not only is it impossible to know which original works were actually utilized in the writing of the text, but I find this format much more prone to error than formal citation. The footnotes mention articles or books that may have influenced the author, but may not have been cited in context or cited at all.

All in all, I find Gazzaniga to be an enthusiastic spokesperson trying to fill a serious gap in the current literature. Still, I look forward to an accessible text by an expert who can focus on the selection model and explain it with patience rather than with the unfocussed energy of the recently converted.

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Fodor, J.A. (1981). *The Modularity of the Mind.* Cambridge, MA: MIT Press.

Politics of Ethnic Nepotism: India as an Example

By Tatu Vanhanen. Sterling Publishers Pvt. Ltd., New Delhi, India 110016, L10, Green Park Extension, 1991, 200 Rupees (ca.$12).

Reviewed by William R. Charlesworth, Institute of Child Development, University of Minnesota, 51 E. River Road, Minneapolis, MN 55455 USA.

This is an interesting book. As noted on the book jacket, it "traces the origin of ethnic conflicts, not only in India but in all ethnically divided societies, to our assumed universal behavioural predispositions, shared by natural selection, to favour kin over non-kin."

Tatu Vanhanen, Associate Professor of Science at the University of Tampere, Finland, has written numerous books on power, militarism and military rule, as well as on political and social structures in various countries. His interest in "how ethnic cleavages affect the nature of political institutions and the process of democratic politics " (p. vii) took him to India[1]. As the largest, most ethnically, religiously, and culturally diverse democracy in the world, India consists of numerous opposing, self-serving groups of citizens, each struggling against the other and at the same collaborating in order to obtain vital resources.

Vanhanen has several agendas. The first is to describe the current ethno-political scene in India using the resulting picture as a basis to test the hypothesis of ethnic nepotism deduced from kin selection theory. His second agenda is to illustrate the persistence of ethnic nepotism outside of India, such persistence suggesting that its origin resides in human nature rather than in socio-economic conditions. He chooses the US as a comparison country because, despite being a highly developed democracy, competing ethnic groups in the US are finding it increasingly difficult to agree on institutional structures that would adequately satisfy their individual needs. His third agenda is a proposal for reforms that could mitigate ethnic conflict if political structures were built upon biological realties.

The starting point of his effort is the fact that ethnic conflicts are very common today. Drawing on Horowitz (1985) (a recommended companion to the present volume), Vanhanen reports that ethnic conflicts have claimed ten million lives since the end of WWII--even in "modernized" countries. According to Vanhanen, no theory (including Marx's) has adequately accounted for these conflicts. In his estimation, the only theory that can do this job is Darwin's theory of evolution by natural selection. As Vanhanen informs us in his introduction, ".. I have tried to formulate a theory of ethnic nepotism derived from the socio-biological theory of kin selection, according to which the ultimate aim of human beings is to reproduce their own genes through their own offspring and relatives" (pp. 1f). He also notes that " ethnic loyalties have so often proved more important and stronger than ideological or class interests" (p. 2).

Chapter 2 contains a synopsis of biological thinking that concludes that conflict over scarce resources is a fact of all life and that those who cooperate do so because they are genetic relatives. Even in large, modern societies genetic nepotism, Vanhanen asserts, is the rule. "Communalism, casteism, nationalism, patriotism, racism, and regional solidarity are forms of nepotism." (p.11). While many proximate explanations can be evoked to account for nepotistic conflict over resources, Darwin's theory of ultimate causation provides the most convincing explanation: individuals have been selected to maximize their inclusive fitness. All else follows from this.

Vanhanen then applies his theory to India which, despite its democratic structures, is plagued by serious ethnic conflicts. Reasons for this include "traditionalism" (old conflicts are not forgotten) as well as "modernization" (it creates or sustain such conflicts since the economic gains of modernization are not equally

[1] A caveat is in order here. The reviewer is only somewhat familiar with India, having been there briefly to do research with young children and having read only a modest amount about modern India and its socio/political problems. Hopefully, these insufficiencies will not detract from a fair and useful review of this book.

shared). Dispensing with these reasons as inadequate, Vanhanen evokes traditional socio/psychological concepts such as in-group/out-group distinctions, xenophobia, and ethnocentrism and connects them with the concepts of inclusive fitness, kin selection and nepotism. Drawing on van den Berghe (1981) and Vine (1987), Vanhanen makes a theoretical case for why individuals show discriminatory preference for individuals most like themselves. Ergo, members of the same ethnic group will avoid social conflict with each other and engage in such conflict with others. Given that our behavioral predisposition to ethnic nepotism is rooted in evolution, he proposes two universal hypotheses--first, "ethnic cleavages always lead to ethnic interest conflicts", and second, "the more a society is ethnically divided, the more political and other interest conflicts tend to become canalized along ethnic lines" (pp. 13f).

In his third and longest chapter Vanhanen presents historical, geographic, demographic, and political information on ethnicity in India and the pressures it puts on Indian unity. Diverse linguistic and religious groups (four of the former and seven of the latter) intersect or underlie "scheduled castes" and "scheduled tribes" to produce a "vast ethnic mosaic" dominated by a Hindu majority (ca. 83%) which itself is also a mosaic of castes and languages. The all-India mosaic consists of geographically (and not so geographically) discrete political groups (more than 80 participated in elections between 1952 and 1984) each attempting to establish its own political power base.

Given persistent shortages of resources, competition and conflict are bound to occur in such diverse country. Of 293 violent social conflicts reported in India between 1980-1988, 25 (ca. 9%) were non-ethnic in character. By Vanhanen's definition of ethnic, the 268 remaining were ethnic--Hindu-Muslim, Hindu-Harijan, tribal-non-tribal, Hindu-Sikh, and other. In light of these data, Vanhanen cautiously concludes that "nearly all violent social conflicts have taken place between clearly different ethnic groups and that ...the genetic distance between conflicting groups has increased the probability of violence" (p. 133).

Chapter 5 deals with an historical analysis of ethnic conflicts in the US. Similar to the Hindu majority in India, the US historically has had a large, dominant majority (whites), but, unlike India, only two major minorities--blacks and Native Americans (Hispanics were probably excluded because they are relative latecomers). The long history of whites encountering Native Americans began in the early 17th Century and resulted in numerous major and minor conflicts that ended a little more than a century ago. Enslavement of the blacks by whites, also beginning in the early 17th Century, was accompanied by long, systematic repression lasting well into the 20th Century. Vanhanen ends this chapter with the conclusion that US social conflicts support his hypothesis that "the more ethnic groups differ from each other genetically, the more probable are violent conflicts between them" (p. 159). That he does not in this, or in other parts of the book, deal with intra-ethnic conflicts, is an obvious omission.

In the final chapter, Vanhanen expands on his idea that ethnic conflicts can be accommodated by certain political reforms. While democratic governments have means of abolishing rank based on ethnicity (as in India and the US), thereby theoretically ensuring a fairer distribution of opportunity, education, and wealth, a plurality electoral system (as in both systems) "is not well suited to plural societies because it produces highly unequal representation of political parties and discriminates against minority groups systematically and may deprive them of representation" (p. 169). To rectify this, Vanhanen suggests the implementation of three "institutional techniques" --federalism, proportional (instead of electoral) representation, and parliamentarism. These techniques would mean fitting political systems to the facts of ethnic nepotism rather than living with nepotism and the endless conflicts generated by it when resources are in short supply.

As already noted, Vanhanen is cautious about drawing firm conclusions in favor of his hypothesis. I would also be cautious. His efforts leave open various questions of definition and methodology. But there is a bigger question still to be asked. Given the nature of his theoretical leanings, what kind of data are (can ever be) available that would lead to a convincing test of his hypotheses? As with all other human research aimed at examining genetic and environmental causes, the causes in reality are always conflated and

can only, at best, be statistically separated. Where the "dependent variable" is so global a concept as social conflict and the "independent" variable of ethnicity so vague and so removed from hard genetic evidence, historical accident, and daily experience, it takes a daring scholar to bring the variables together to test for their causal connection.

Despite these shortcomings, Vanhanen, in my estimation, is on the right track in taking on the problem of nepotistic conflict. The question is whether at present the track is scientifically strong enough to carry the freight of explanation required to account for one of the most dangerous social problems facing us today. Rushton's (1989) work on genetic similarity and altruism and the recent volumes by Herrnstein & Murray (1994) on the contribution of intelligence to social stratification and by MacDonald (1994) on Judaism as a group evolutionary strategy are current examples of this. Does social stratification begin, persist, and end with genetic disparities in those cognitive skills that contribute to economic and social success? If so, what should policy makers and citizens in a democracy do with such knowledge? If social conflict truly is based on ethnic nepotism, and ethnic groups differ in cognitive skills, and all individuals are genetically programmed to maximize their fitness, what steps should reasonable people take to avoid social conflict? Or should any steps be taken at all? These are not strictly scientific questions, but scientists are going to be asked them anyway.

If there is a more exciting combination of variables to get the adrenaline of cultural relativists and evolutionary determinists flowing, I would like to hear about it. Vanhanen's effort is an introduction to this combination that needs careful consideration. Cultural relativists who hope their formulations will help resolve social conflicts ought to turn to Vanhanen and broaden their perspective to include inclusive fitness. Evolutionists ought to examine how far the logic of their position can justifiably extend into such a complex phenomenon as human survival politics. Future generations have a lot of stake in this.

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ANNOUNCEMENTS

Gruter Institute Seminars

The third annual faculty seminar on "Biological Perspectives in the Social Sciences" will take place at Dartmouth College 5-11 August 1995. Directed by ISHE members Roger D. Masters and Michael T. McGuire, visiting lecturers will represent diverse fields in the biological and social sciences. Invited lecturers are Miguel Marin-Padilla, Robert Trivers, Lionel Tiger, Helen Fisher, Robert Frank, E. Donald Elliott, and Edward Berger. A limited number of grants covering expenses exclusive of travel (estimated at $300) are available to scholars or graduate students. For information or applications write: Ms. Kimberly Watson, Nelson A. Rockefeller Center for the Social Sciences, 6082 Rockefeller Hall, Dartmouth College, Hanover, NH 03755-3514 USA, tel. 1-603-646-3874, fax 1-603-646-1329.

A similar seminar is being organized at the Squaw Valley Inn, Squaw Valley, California24-29 June 1995. For details contact Ms. Gerti Dieker, Gruter Institute for Law and Behavioural Research, 158 Goya Rd., Portola Valley, CA 94028 USA.

Request for Research Assistance: a Prepucition

Any information on foreskins of the great apes, sexually transmitted diseases in feral primates, or the pheromonic qualities of smegma is being solicited by two of our members. Contact Wade C. Mackey, Dept. of Psychology, Southeastern Community College, West Burlington, Iowa 52655 USA or Ron Immerman, E-mail rimmerman@mhnet.mhmc.org.

American Anthropological Association Panel

The Gruter Institute sponsored a panel on "Where in human nature do human rights come from?" at the AAA convention in Atlanta, Georgia 1 Dec. 1994. The program was organized by Oliver Goodenough and Lionel Tiger. Speakers included Frans de Waal, Robert Wright, Ward Goodenough, Roger Masters, Laura Betzig, and Beth Stevens. Jane Lancaster was the discussant.

Association for the Study of Animal Behaviour

The summer meeting of the Associaton for the Study of Animal Behaviour will take place 12-14 July 1995 in Leiden, The Netherlands. The main theme will be 'Behavioural Mechanisms and Evolution." For information contact Carel ten Cate, Institute of Evolutionary and Ecological Sciences, Faculty of Mathematics and Natural Sciences, Kaiserstraat 63, P. O. Box 9516, NL-2300, RA Leiden, The Netherlands; fax 31-71-274900.

CURRENT LITERATURE June 1995

Interested in possibly reviewing one of the books below or some other suitable book? Please contact the appropriate book review editor (see Editorial Staff box).

Submit items for Current Literature to Bob Adams (see box). Please be sure that the item has not yet appeared.

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