

THE ASCAP NEWSLETTER

Across-Species Comparisons And Psychopathology Newsletter

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"Theatre, no matter how realistic the staging, must always evoke in the mind's eye sights that the physical eye cannot see. Beyond this level of theatrical illusion there is Coleridge's 'willing suspension of disbelief,' the ability of the viewer to know and not know at the same time."
Bennett Simon¹

Newsletter aims

1. A free exchange of letters, notes, articles, essays or ideas in brief format.
2. Elaboration of others' ideas.
3. Keeping up with product ions, events, and other news.
4. Proposals for new initiatives, joint research endeavors, etc

The ASCAP Newsletter is a function of the International Association for the Study of Comparative Psychopathology

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IASCAP Mission Statement:

The society represents a group of people who view forms of psychopathology 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 resulted in psycho-pathologically related states. We are interested in the integration of various methods of study ranging from that focusing on cellular processes to that focusing on individuals to that of individuals in groups.

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Comment

Congratulations to **IASCAP's** new president: Paul Gilbert has now been named Professor of Psychology at the University of Derby!

We look forward to Paul's in-

creased leadership there (as well, of course, as his continued involvement with IASCAP). He has been charged with the development of more research in his new position even as he will continue working with patients.

One form of his leadership with **IASCAP** concerns the international components of the newsletter - he has suggested that a subsidiary address should be in England so that the next subscription will be more user-friendly to those outside the USA, given currency exchange hassles. We are working out the details.

Note the new format! Paul is not the only leader amongst the Executive Council. Our new President-Elect, John Pearce, has suggested Helvetica fonts which we have finally been able to down-load into the ASCAP computer and thereby deploy them. Like other new instruments, of course, the first usages may not be optimally implemented. Let us know your reactions as preferences of the readership guide its newsletter.

Note too that we have attempted to enhance the white space. Two refereed-journal editors (Henry Nasrallah and now John Birtchnell) have urged increased spacing for easier readability.

Laudably, the proportional Helvetica font allows considerably more copy per page. Still, one local reader wistfully said of the old font, "It was warm and comfortable, like sitting next to a fireplace." Hopefully, with the familiarity of usage, the new format will feel as comfortable.

The 1993 meeting of the Human Behavior and Evolution Society (HBES) in Binghamton, NY, had for me some unexpected -- indeed surprising -- results. I believe that those of us interested in clinical matters in the context of evolutionary contexts found some mutual communalities. Typically, we each have our fiercely defended areas of special interest and emphasis, but the competition -though not abolished nor absent -- was outweighed by the cooperation and mutual support. Some of that is reflected below in the report of a meeting in which Bowlby's work in the context of agonism was discussed by clinicians primarily.

More generally, new readers of The ASCAP Newsletter emerged and demonstrated interest in its regular activities. Already enlisted readers met one another, some for the first time and were able to explore areas of mutual interest.

There is much more to be said of this meeting (and will be later): in addition to the personal contacts, many areas of content interest emerged and commanded excitement, some of which are redundant with the LSE meeting reported by John Price this issue. More forthcoming in future issues.

Letters

5th July, 1993

"ASCAP PRESS" omitted twelve words from my last contribution to the Newsletter (Apr issue)? Now it reads: "Beck's (1983) useful distinction between defeat depression and deprivation being more vertical and deprivation depression more horizontal, but the theoretical background from which this distinction is derived cuts across dimensions." It should have read "Beck's (1983) useful distinction between defeat depression and deprivation depression goes some way towards separating the two dimensions, defeat depression being more vertical and deprivation depression more horizontal, but the theoretical background from which this distinction is derived cuts across dimensions."

My proffered contribution in response to John Price is long (I'm sorry) but John's was long too and I still haven't responded to all the points he made.... [Dr Birtchnell's response will be provided in the September issue of ASCAP]

If I may be permitted to join the space debate, I also - perhaps in capacity as a journal editor - believe that there should be more spaces. You will see, for instance, that I have put subheadings into my contribution [to be published next issue], which I think contribute to the clarity. I like the double columns and the boxes.

I enjoyed the London School of Economics Evolution conference very much, and I now feel I understand evolution processes more clearly. When I was discussing the conference with my very bright eighteen year old son, he said to me, "But we humans have stopped evolution because we look after the unfit members of the species." Perhaps this is the answer to the altruism debate. I think my ideas about lowerness fit in here somewhere too. I came away more than ever convinced that evolutionists make simplistic jumps from animal to human behaviour without taking into account the tremendous sophistication of human cerebration.

I like Leda Cosmides best for (1) her interest in things happening unconsciously, (2) her idea of the brain having a number of specialist functions, and (3) her daring to use the term human instincts. I also like Randy Nesse for emphasizing how doctors underestimate the value of defensive symptoms like cough and diarrhea. I wonder if he also extends this to psychological defense mechanisms. What surprised me was the total lack of psychodynamic processes of most of the delegates. The LSE person, Christopher Badcock, seemed to be the one exception.

I got an invitation to visit Edith Cowan University in Perth, Australia, for five weeks beginning 1st August.

John Birtchnell, Institute Psychiatry, London, UK

Letters continued

27 July 1993

You asked me in the July Newsletter to explain why I thought it would "pay" in evolutionary terms,

for women in general to marginally underestimate their intelligence and for men to do the reverse. This idea rests on two assumptions. The first, which I have already made explicit, is that the commencement of the ice ages meant rapid changes in environmental conditions which placed adaptive intelligence at a premium. The second is that, whatever men may think, it is women who do most of the sexual selecting.

With these assumptions in mind, take a ruthless would-be dynast as a metaphor for natural selection. He has a son and daughter and is determined to maximise the evolutionary prospects of his genetic line. He is prepared to manipulate his children with the utmost ruthlessness to achieve this. With his son, he knows his best hope lies in the boy being picked by a female (assumption 2) whose evolutionary quotient is high. Inter alia, this means a lady who is actively looking for an intelligent male (assumption 1) and who has the physical attractiveness which ensures plenty of choice. The second element is important because it should result in attractive off-spring who in turn could be highly selective.

Now the father knows that it is pointless to have the boy believe that he has an IQ of, say, 150 if, in fact, it is 95. Playing that far out of your class is sure to lead to exposure. But as every greengrocer knows, you must polish up your fruit and put the best of it to the front of the stall. On this basis, it is simply good salesmanship to have the son act as if he were marginally brighter than he actually is. It is also probably essential as the smart competition will be doing exactly the same. As acting is always best when the actor "gets into the character," in managing his son's ego development, the dynast would seek to instill the modes margin of intellectual over-confidence found in the Edinburgh study I referred to in July.

With the daughter the position is different. The risk is that she will rush off and chose some bone-headed adonis who will set up camp at the foot of an expanding glacier. She must therefore be made to think that (a) intelligence is the most important thing to look for in a male, (b) that, as she is slightly deficient in it (though she mustn't overdo it - don't want to destroy her self-confidence), it is not a quality that she dare undervalue in selecting a partner. "My darling, you're lovely, but you're not super-bright. Whatever you do, don't marry a bone-head. You know about nice Abbot Mendel. Well, we don't want a full house of bone-headed grandchildren, do we?" Not that she is not being told she is unattractive, quite the reverse; merely

that she must use her attractiveness to make up in the next generation.

Given the savage selective pressures the ice ages have provided, natural selection plus mutation were quite capable of matching the strategic planning of the most Machiavellian of dynasts. Hence my "Miller/Monroe effect" and what Dennett, very elegantly, calls the "Great Encephalization."^A

Mike Waller, Glenclyne, Worcestershire, UK

Odintune communique on two conferences

by John S Price

Here is a report from our recent activities. I really wished you could have been at both events. The world is getting smaller, but it is not yet small enough. It was good to talk to you on the phone the other day and Dan was pleased too - and the assembled company sent warm greetings to their much valued Editor.

What could mark the coming of age of evolutionary biology more symbolically than a meeting on "Evolution and the Human Sciences" at the London School of Economics (LSE), June, 1993?

Only a few of the Birmingham Group were able to get to it - Brian Heard, Dorothy Lake, John Birtchnell and your reporter, but after the conference (see second report below), we came down to Odintune for the weekend (thanks be to An-tonia) and were joined by Michael Chance, Dave Stevens, Anthony Stevens and Sarah White. Paul and Jean Gilbert could not come as Paul had still not thrown off a bad attack of whooping cough, and they were much missed. We were joined by Dan and Sandy Wilson who were just about on their way back to Boston after their year at Cambridge (with a beautiful English girl called Victoria born in England on Christmas day). Also from the LSE meeting came Alan Lloyd from Ohio, Randy Nesse from Michigan and Christopher Bad-cock from no lesser place than the Sociology Department of the LSE itself. We were able to debrief ourselves from the meeting and share items from the conference in June sunshine which indicated the favour of the Gods.

But I am ahead of myself; first let me report on LSE. Here is report 1.

The LSE answered a question which has bugged me for a long time. In Milton Keynes I had to treat a lot of one-parent mothers who were lonely, short of cash and could not afford baby sitters to go out in the evening. They had miserable lives on their own and I could not understand why they did not get together and share. But now I think it was a matter of the incest taboo which was discussed at the LSE by John Tooby from the University of California. He presented evidence from Israel, Taiwan and other places that children or adults who share a household with children in the years up to age six develop a relationship characterised by incest taboo (called the Westermarck effect, after its discoverer). (Recently Mark Erickson suggested that these relationships are also characterised by kin altruism).⁵

This seemed to solve my Milton Keynes problem. Over the course of evolution one role of mothers has been to find mates for their children, and these chosen ones (not always accepted, of course) are usually to be found among the children of their close friends or even of their sisters. Therefore, intuiting the Westermarck effect, no woman wants to bring up her children in the same household as those she might want them in future to marry, and this may have been the self-sacrifice which kept those Milton Keynes mothers in such an isolated state.

John Tooby thinks that the function of the incest taboo is to reduce homozygosity, which makes it more difficult for parasites to track and imitate their host antigens - perhaps it also has a social role in encouraging exogamy and kinship alliances. In case the Westermarck effect is transmitted by olfaction, seafaring men and other deserters of their young children should take the swaddling clothes for a pillow, and leave their sou'-westers at home for their daughters to learn the smell of. Otherwise the girls at home may seem just like those in another port, and visiting Daddy may appear like a romantic troubadour.

Martin Daly and Margo Wilson (Psychology, McMaster) pointed out that humans are much nicer to step-children than most animals are. Nevertheless, in the USA a child is 100 times more likely to be murdered by a step-parent than by a biological parent. Surprisingly, in Canada and the UK the increase in risk is only two-fold. Among a tribe of South American foragers the death rate by the age of fifteen was 19% for children raised by two biological parents but 43% for those raised by a parent and stepparent.

In Germany in olden times, for children who had lost a parent, survival was reduced if the surviving parent re-married. Unfortunately, Daly and Wilson did not present data on step-parents who had lived with the child for the first three years of life when the incest taboo and kin affiliation are thought to be imprinted ~ is the better treatment of biological children due to this presumably unconscious process or to the conscious knowledge about paternity?

Several speakers stressed the difficulty of teaching evolutionary biology. In a recent survey, less than 50% of Americans agreed to the proposition that humans have a common ancestor with animals. Even among those who are more sophisticated about pedigrees, there is hostility to Darwinism which is mistaken for the Social Darwinism of Herbert Spencer and those who teach evolutionary biology are thought of as right wing and as giving politicians the ideological justification for oppressing and exploiting the masses.

There seems to be a belief that those who study the "dog eat dog" aspects of human life in some way approve of the behaviour they are studying, a belief which does not apply to those who study the tubercle bacillus and other less social scourges of mankind, and here we may be seeing an example of the innate differences in perception which are applied to social and non-social phenomena, which were described to the conference by Leda Cosmides (U Cal; alias Mrs John Tooby).

The social exchange scenario is roughly as follows (my own example). Say you are hunter-gatherer Smith, and leader of a group of hunters which comprises yourself, Brown and Jones. You have negotiated a rule with the other families by which, whenever a bird is brought home and cooked by the womenfolk, the white meat is divided equally among all the children but the brown meat goes exclusively to the Smith children.

When you come home unexpectedly from hunting, who do you check on to make sure the rule was not being broken in your absence? Obviously, you check on the Brown and Jones children to make sure they are not eating brown meat; you don't need to check on your own children because they could be eating either white or brown meat. Or, you check on who is eating brown meat; you don't check who is eating white meat because this could be anybody.

This problem is easily solved by the vast majority

of people when it is presented in this "detection of cheaters" form, but when exactly the same logical problem is presented in a non-social form, only about ten percent of people get it right, and this includes people who have had a training in formal logic. Leda Cosmides presents this as evidence for modular processing in the brain, and she claims that something similar occurs in the perception of threat signals, but unfortunately her data on this are not published yet.

David Haig from Harvard gave a fascinating talk on maternal-foetal conflict during pregnancy. I had not realised that man shares with bats, sloths and some other mammals an "invasive placenta" whose foetal cells travel up the uterine arterioles and destroy the sympathetic nerve fibres which might constrict them and so reduce the foetal blood supply. Nor did I know that the foetus secretes into the maternal circulation hormones which reduce the mother's sensitivity to insulin and so raise her blood sugar and thus force her to provide more nourishment for the foetus, rather than preserving her resources with the idea of having another baby - and also hormones which raise her blood pressure and so improve the uterine circulation at the risk of maternal eclampsia. Even before birth the mother-infant conflict has been raging in a form of chemical warfare unknown to either of them.

John Archer gave an excellent talk on aggression and I wish I had taken some notes. Data on homicide are being used as an "assay" of domestic aggression, showing, for instance, that stepfathers are much more aggressive to children than fathers, and that wives of 15-20 are killed much more frequently than their older sisters; and although young men are more likely to kill other men, it is the older husbands who kill the young wives. These data seem to bear out the anthropological findings that most domestic homicides are due to sexual jealousy.

Report 2. Back at Odintune after the conference, we had some good discussion. Randy Nesse, who had been a "Keynote speaker" at the conference and had, with George Williams, presented the idea of Darwinian Medicine (adumbrating their forthcoming book) challenged us with the idea of using the prisoner's dilemma to classify emotions. How do you feel when you have co-operated and the other guy has defected? And what better definition of smugness could you get than when you both co-operate? In the course of his fascinating LSE talk on the adaptive function of various symptoms and diseases, Randy mentioned the idea that the rabies

virus preferentially infests the centres controlling aggression and biting so that sister viruses in the saliva will be more readily transmitted; and that certain arthropod parasites so manipulate the brains of their insect hosts to climb to the top of a blade of grass and to grip on there until eaten by the mammalian alternative host of the parasite.

Also at Odintune there was some discussion of a recent TV programme about language in chimpanzees, stimulated by Steven Pinker's LSE talk on The Evolution of Language and his reminding us that the spinal neurones controlling the muscles controlling vocalisation in the chimpanzee are not innervated by the pyramidal tract, so that they are not under "voluntary" control, and this would make it difficult to teach them to speak, even if they had other human adaptations such as the descended larynx.

In the TV programme a chimp was offered two plates of sweets, one containing more than the other. When the chimps extended a hand to one plate, they were given the contents of the other plate. Even though it seemed clear that they had learned the rule, they were unable to prevent their hands stretching out to the more attractive plate. However, when they were taught to recognise Arabic numerals, they were able to restrain their hand from stretching out to a plate marked with a 5 and steer it towards the plate marked 2. In some way the rise in level of abstraction in the perceptual aspects of the task allowed a greater degree of "voluntary" control over the executive aspects of the task. (One wondered how they would have fared with plates containing different numbers of, say, matches). Has this any message for those of us who are interested in helping patients to replace an "involuntary subordinate strategy" with conscious "acceptance" and voluntary yielding?

Also at Odintune, Alan Lloyd mentioned some other interesting work on chimps. When baby chimps are subjected to certain orbito-frontal lesions, they lose the capacity for certain higher mental functions such as the ability to delay a response; but at puberty the capacity is regained and their behaviour returns to normal. Conversely, baby chimps who are subjected to certain dorso-lateral frontal lesions suffer no impairment during childhood, but at puberty they develop exactly the same disability which the orbito-frontal lesions caused before puberty. This suggests that at puberty sex hormones switch the execution of certain functions from one part of the brain to another, much as a snake leaves behind an old skin.

Recently Christopher Badcock, who organised and spoke at an LSE symposium on "Psycho-darwinism", has suggested that the Oedipus complex is resolved by an innate brain programme some time around the start of the "latency period". These chimpanzee findings suggest an alternative: perhaps at puberty it is just left behind in an old abandoned bit of brain.

Next month at the annual meeting of the Royal College of Psychiatrists there is a whole day's symposium on "Evolutionary theories of the origins of psychiatric illness" at which the batting order is Marks, Nesse, Crawford, Troisi, Kellett, Price, Bir-ley and Crow (the organiser); of these, Marks, Troisi and Price had constituted the speaking team at a Marks-organised LSE symposium on "Evolution and psychiatry" (fortunately the audiences at the two meetings will be quite different).

It does seem that psychiatrists and others are beginning to take evolutionary biology seriously. Also some of the "keynote" talks at the LSE conference were published in the June 26 issue of the Times Higher Educational Supplement.

Bimodality - **Categories or Dimensions?**

by D Stevens

An earlier draft of this paper posed the question of whether the two modes ~ agonic and hedonic ~ should be conceived of as categorically discrete or as distinctive states resulting from continuous change on several underlying dimensions, an issue raised in the "Consensus statement on the two modes" by Price (and Chance) -- ASCAP Oct 1991 ~ in which it is felt that a "categorical terminology is justified. Circulation of the first draft resulted in welcome comments from John Birtchnell and John Price. A London meeting of the Bimodality and Social Fabrics discussion group then addressed this issue in mid-May, when a four-dimensional model was tentatively proposed. Circulation of this model brought further comment and useful references from both Johns, Michael Chance, and Paul Gilbert.

What follows is a brief summary of the various models so far proposed in relation to the two modes, an account of a useful communication system model of relationships, an outline of the proposed four-dimensional model, and some fur-

their thoughts on theory-building.

The two modes, agonic and hedonic, have usually been taken to be categorically distinct, but in recent years a variety of dimensional systems has been used in relation to them. Birtchnell⁶ has explicitly proposed an integration of his two-dimensional model of interpersonal relating with the two modes (see ASCAP Sep 1991 & Apr 1993), and Price⁷ has found this useful, whilst differing on the manner of integration. Birtchnell proposes that the modes result from mixtures of closeness-distance and positive-negative relating (ASCAP, Mar 1992, p7), whereas Price prefers to "use Michael Chance's concept of agonic/hedonic" for a third dimension in addition to Birtchnell's pair (ASCAP, Jun 1993, p10). Gilbert has mapped the modes onto a multilevel model of biosocial interaction, in which various dimensions feature, such as positive-negative social signals, positive-negative affective states, and intimate-public distance. The agonic and hedonic modes emerge from the activity of defense and safety systems, respectively, these systems themselves being conceived as underpinned by further dimensions.⁸ Thus, the variety of dimensional notions is great, as also is the range of proposed models. The present model seeks to reconcile some of these differences and other matters.

As well as the question of dimensionality, two further issues have been to do with the relation of the two modes, *agonic* and *hedonic*, to other bipolar constructs such as *competition-cooperation* and *coercion-consent*, each of which involves control of resources or an imbalance of power. These other constructs have been implicated in the nature of the modes. (Can there be hedonic competition? Is success in competition for resources characteristic of one mode only? Is a power-asymmetric relationship necessarily agonic? Can one be reconciled to an agonic structural relation? Do competition and coercion indicate agonism, whilst cooperation and consent are hedonic?) How do these matters relate to switching between modes?

A recent analysis of relationships considered as systems, in which interindividual feedback occurs through mutual behaviour-signal-response-signal communication and interaction, may throw some light on these matters, and forms a basis for the later model.

Alan Fogel proposes a communication system approach to relationships, in which dyadic routines [such as those typical of the two modes] develop

through a process of *co-regulation*, during which the individuals monitor each other's behaviour as providing information about the nature and state of the relationship, adjust their own behaviour accordingly, provide signal information to the other in so doing, with consequent readjustment, feedback, and so on.⁹ Through this systematic process the pair negotiate a stable outcome for their relations, socially and spatially, which Fogel calls a *consensual frame*. The notion of *framing* derives from the work of Adam Kendon on frame attunement in face-to-face interaction, which proposes a number of domains in which agreement must be reached between dyadic participants, through preliminary defining communication, or *framing*, before informative communication may proceed.¹⁰ These domains are remarkably similar to those under scrutiny in the bimodality debate, including attention direction, spatial location, postural orientation, and topic. Activity in each of these domains serves to develop, through co-regulation, a communicative frame, a "working definition of the communication situation," or "a *co-regulated consensual agreement* about the scope of the discourse: its location, its setting, the acts that are taken to be significant vs. those that are irrelevant, and the *main focus or topic*." Fogel, 1993, p36, cites Bateson,¹¹ Garfinkel,¹² Goffman¹³ and Kendon.¹⁰

If we take this perspective, then, so long as both parties, through a process of interaction and communicative feedback in attention direction, spatial location, posture and topical focus, are able to reach a stable state of mutual relationship, or consensual frame, it matters little whether the mode of relation is agonic or hedonic. Each mode will persist until the relation is broken or the situation changes to force an adaptive switch, and so each mode may be considered as a consensual frame, despite the fact that in one there is a power imbalance and in the other, not.

In the agonic mode the inferior individual remains at a distance from the superior, and from other lower-ranking individuals, as they from it, through a homeostatic [or autostatic] process, in which the various individuals have settled at respectively comfortable and sustainable locations; in the hedonic mode these distances are lesser, but also mutually maintained through consensus. Changes in the situation, such as resource scarcity, or in individual satisfaction levels, produce a destabilization of the modal state, and either a gradual or a sudden breakdown, either of which involves a redefinition of the relationship, a reframing, through co-regulatory activity, the difference being in the speed of the redefinition. Where there are two

modally distinct frames, each well-defined and rapidly co-regulated, a switch from one mode to the other may easily occur; where either or both modes are ill-defined or where the co-regulatory activity is undeveloped or confused, rapid switching is not possible and protracted, perhaps inconclusive, frustrating, and possibly pathological interaction will ensue.

So long as both parties consent, through co-regulation, to the current frame, it does not matter whether the frame is competitive or cooperative in terms of resources, close or distant in space, equitable or imbalanced in power, instrumental or expressive in function, or any of the other polar oppositions which characterise the distinction between the agonic and hedonic modes.

If, however, the reframing occurs through coercion rather than through consent, that is through the exercise of controlling power by one individual over the other in a dyadic relationship, then the frame will be unstable and the relationship, in whatever form, will break down or switch.

Thus, the issues of competition/cooperation and coercion/consent are not related to one or other mode, but to the process of co-regulation in framing the interaction; the modes being stable frames resulting from this process. Bearing this in mind, therefore, let us turn to a consideration of possible dimensions underlying the two modes.

It is perhaps best to begin with concise definitions of the two modes. The *agonic* mode is characterised by a single dominant individual, upon whom all others' attention is focused, and is hierarchically ordered in rigid ranks. In the agonic mode, higher-ranking individuals "accord less and receive more attention than those lower in the social scale" according to Chance.¹⁴ Control is maintained by the threat and use of force; the dominant hierarchy is detached and individuals keep their separate distances, according to rank; tension and arousal are high.

The *hedonic* mode is characterised by a non-hierarchical network structure, with flexibly distributed attention, changing focus according to individual interest or charismatic display, with appeasement and reassurance as the control mechanisms. There are status relations between individuals, but no dominance hierarchy, no ranks, nor any single leader. Social proximity is maintained, close interindividual contact is frequent and prolonged; tension and arousal are low.

Assuming these characteristically distinct modal states to be the products of change in more than one dimension, that is, assuming that agonic and hedonic modes are not categorically discrete nor simply opposite poles on a single continuous scale of social relations, how many dimensions do we need to account for all the facets of the two modes which, in whole, characterise their differences?

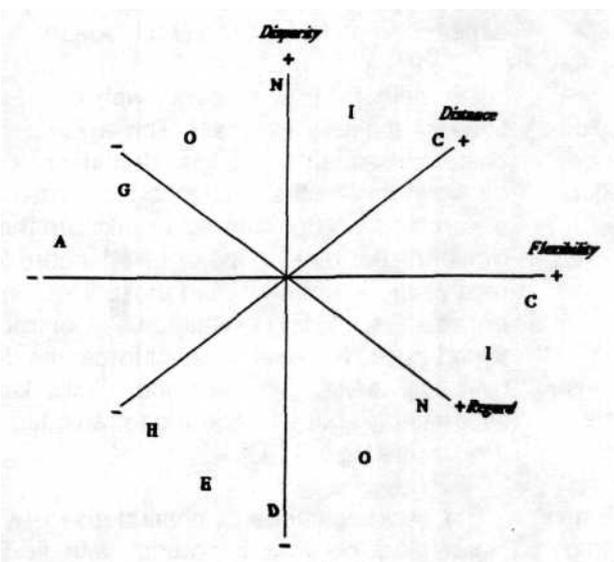
1. *Distance*. Interindividual spacing is a fundamental index of modality. In the agonic mode it is greater; in the hedonic mode, less.

2. *Flexibility*. Both attention structure and social structure are rigid in the agonic mode, and flexible in the hedonic mode.

3. *Disparity*. Inequality between individuals, in power and resource control, and in rank or status, are characteristically agonic, whilst the hedonic mode has fewer discrepancies, of lesser degree.

4. *Regard*. The quality of interindividual attention and communication can be positive or negative; it is characteristically positive in the hedonic mode, and negative in the agonic.

These four dimensions can be represented conceptually in the diagram below, and the two modes may be mapped onto them as follows.



4-D model of bimodality

Thus, in the agonic mode, disparity and distance are great, regard is negative, and flexibility is low. In the hedonic mode, disparity and distance are small, regard is positive, and flexibility is high.

Some of these dimensions encapsulate others which have pre-

viously been proposed. Disparity combines the notions of rank and status differentiations with the dimension of upper-ness and lowerness proposed by Birtchnell (*ASCAP*, Sep 1991). Disparity involves both the degree of interindividual inequality and the number of such inequalities in the group. Thus, a highly-ranked hierarchy and a single differentiation of great degree are each highly disparate; a structure of many and great rank differences, even more so. Status differences likewise may reflect more or less disparity between individuals, whether they are related to a rank hierarchy or not.

Regard combines Birtchnell's relating dimension, with its connotations of quality of affection, with Price's distinction between anathetic and catathetic signals in interindividual communication, which have a boosting or putting-down quality respectively for the recipient and referent of the information. The term *regard* is chosen to encapsulate these elements because of its prior use in this sense by Carl Rogers, and because the term also denotes specifically a quality of *attention*.

Flexibility encompasses the issues raised by Fogel with respect to the degree of possible co-regulation, that is, control through consent rather than coercion allied to the ease of negotiation through mutual interaction with congruent aims or motivations.⁹ Greater flexibility allows for smoother change and more abundant possibilities for the emergence of new social relations; less flexibility restricts social relations to a relatively rigid social structure with little possibility for change except through sudden reordering of the same individuals within a restricted and unchanging set of roles, by fragmentation, revolution or collapse.

This notion draws on George Kelly's proposal that construct systems, that is, systems of relation between bipolar constructs, employed for the anticipation of events, are characteristically more or less flexible or rigid, and thus more or less capable of change. Other properties applied to constructs might also be applied to frames, an extension of Kelly's personal construct theory into the interpersonal domain, since in the original formulation of the theory, corollary postulates explicitly deal with interpersonal cognition and social interaction; further, other corollaries state that constructs are limited in range, vary in permeability to new information, may be used in rapid succession, and may be inferentially incompatible with each other, as in the case of co-regulated consensual framing (or re-framing), and bimodal switching.¹⁵

Finally, the phenomenon of switching from one mode to another must be addressed. That switch-

ing occurs is not in doubt, although the conditions under which it shall occur are not agreed upon. In terms of a multidimensional model such as that above (and irrespective of whether these or other dimensions eventually emerge as valid descriptors of bimodal activity), it is useful to be able to call upon an account of sudden changes of explicit state resulting from continuous change on various implicit dimensions. Two areas of theory provide just such accounts, the work of David Bohm on order, structure and form in dynamic systems, and catastrophe theory, which it is here proposed should be the subject of further scrutiny in seeking to explicate the nature and functioning of the two modes (see, for both, Waddington).¹⁶

Is there life after Bowlby?

Report on meeting convened by John Pearce and Leon Sloman after hours at HBES on 8/5/93.

Present in addition were John Price, Dan Kriegman, Kalman Glantz, Frank Sulloway, Gerald Beroldi, John Beahrs, Claudette Beahrs, Ronald Immerman, Anne-Liese Pontius, and Russell Gardner (reporter).

Frank Sulloway described the circumstances of Dr Bowlby's death which happened in 1991 shortly after he finished his biography of Darwin. Bowlby had been born in 1907.

Leon Sloman brought up the similarity between an agonistic loss and the loss of a love object, but noted that these have been generally handled conceptually in very different ways. He noted further that social rank hierarchy and attachment are inextricably intertwined. Insecurely attached children show difficulty in handling agonistic situations whereas securely attached children and non-human animals accomplish this better.

Dan Kriegman commented that Robert Trivers was brought to a treatment center for victimizers in the late 1970s and when there gave examples of rape in many species in the animal world. He contrasted circumstances of human rape: (1) people who rape in their own communities are often "broken" people and this is the only way that they can perpetuate their genes. (2) Marauders can rape elsewhere and still be model citizens at home. Are these better phrased as an adaptive/broken or as separate adaptive strategies? John Beahrs wondered if rape in males is like cuckoldry in females.

Dan told of assaultive offenses occurring more often after an important loss thereby linking the agonistic and affiliative domains.

Leon told of having met with EO Wilson who told of a study in which parenting attitudes of relatives are warmer towards a sister's children than towards a brother's ~ because maternity is more certain than paternity. John B noted that they put selective pressure on each other.

Leon discussed the involuntary subordinate strategy (ISS) which is the new term adopted by himself, John Price, Russell Gardner and Paul Gilbert (after Paul's pioneering use).¹⁷ This is a mechanism to turn off aggression. If a child's anger doesn't cause the mother to reappear, then the ISS goes into effect which is equivalent to losing an agonistic encounter. John B noted Engel's conservation of resources; Leon noted that John Price likens the ISS to hibernation, but suggested that metabolism increases not decreases. John Pearce mentioned the phenomena exhibited by Bowlby's classic children in the hospital.

John Price commented on his discomfort with attachment invariably modeled on the parent-child relationship, but in fact adult-adult affiliation is important and should be investigated in its own right. John Pearce asked if longitudinal studies address this.

John Price noted what Bowlby contributed: (1) there are three stages in separation, and (2) it is good to have a mother. Dan listed problems with Bowlby's ideas: how relevant is the "protection from predators" idea? We have much other business with each other but Bowlby addresses little by way of other motivation. Frank noted that he personally was initially disappointed in Bowlby, but then commented that Bowlby was modest, that he took a small thing and tried to fix it. He didn't have grandiose ideas. He persuaded by details, like his hero Darwin, who accumulated them innumerable.

Leon mentioned Kohut. Dan mentioned that Kohut talked only of self-object with no mention of parent-offspring conflicts. Leon asked for the clinical relevance of this. Dan commented that conventional psychoanalysis overstates conflict theory and that Kohut went too far in the opposite direction. Freud didn't see the mutuality; Kohut didn't see the conflict. Leon insisted on clinical relevance. John Pearce noted the book written by himself and Kalman Glantz.¹⁸ Kalman noted that one element, that of conflict between the sexes on reproductive strategies, works with couples who overly

pathologize each other. John Pearce noted that his practice emphasizes behavior as normal and evolved. Dan emphasized that people then feel less depleted. Kalman emphasized the importance of not ignoring reproductive strategies and noted his finding that clients are very grateful.

Sexual conflicts were then the center of discussion. John Pearce noted their prevalence. Ron Immerman mentioned sexually transmitted diseases (STDs) and that he doesn't talk much to the psychological community but noted that family doctors understand him instantly. Leon asked to what extent he deals with the gay community and Ron noted that they have been practicing safe sex: only a small percentage of his practice are gay; fear has been an important motivator, but inattention may be emerging again.

The group then discussed how to organize further the symposium presentation on evolution and psychotherapy. Some members of the group (not the reporter) met again after the keynote speech by George Williams the following evening.

Alpha State as an Outcome of Psychotherapy

by Russell Gardner

Leon Sloman organized a symposium on evolutionary strategies and psychotherapeutic interventions at HBES Aug 7, 1993, in Binghamton. I contributed the following and am including it here partially because time constraints make it simpler. Selected other papers from the meeting will be presented in later issues. The abstract to follow (expanded from that published in the meeting book) was followed by three case histories.

Abstract: Alpha communicational states differentiate dominant and "control" animals in animal groupings. One way of characterizing such states is to contrast fixed and heritable components of polygenetically inherited traits: to use a metaphor from the skeletal system, fixed components include the fact of four limbs but heritable components are varying limb size. Similarly, every individual has the capacity to exhibit an alpha state homologous to that of non-human animals (dominant or control animals), but timing, manner and signals are highly changeable. Some components ~ threshold components or temperament ~ may be inherited from parents.

Human examples of such states may include comfortable efforts at organization, exploration and control. In human social life, many people function accordingly in many settings. Talent, skills and many other factors allow exhibition of alpha state in some circumstances while less in charge in others: a leader at home may be a subordinate to some at work, but even there in charge of a desk, schedule or component work segments.

In contrast, patients are often inhibited, shamed and fearful across many diagnostic categories. These are feelings of subordinate social rank. They typically feel the therapist to be more authoritarian than reality and transferentially bring painful lessons learned from other relationships to the treatment, assuming the therapist to be harsh also.

Psychotherapy provides unexpected permission for such feelings. Commenting on feelings instead of acting as the patient seems to expect allows a respectful interaction that includes therapist interest in patient exhibition of alpha states, similar to parents toward offspring accomplishments.

Mental health implies that people are free to develop their talents. Indeed, alpha states are expected in everyday life though if one is feeling defeated, anxious or involuntarily subordinated, this may be difficult or impossible. Psychotherapy helps people enhance these with relative safety. Case examples illustrate.

Case of the constrained leader

IA is a 47 year old, highly functional professional section chief who consulted me when his superior at work seemed critical about IA's management of a personnel problem. He felt more down than the situation warranted; he was in fact treated as were other section chiefs. But in illustrating the situation, the superior had used an allegory that IA felt aimed pointedly at him. The superior denied this, but something had changed: they were more distant; meetings of the two were no longer called.

IA met criteria for dysthymia. We met weekly in psychotherapy for about eleven months. He had sought me because earlier I had been a consultant to him (and the superior) for some complicated psychiatric administrative problems with front line employees of the section. He did not need or want medication.

IA's father had been severe, alcoholic and demeaning; he had beaten up IA's mother. IA had

been intimidated by his father and had taken on a "good boy" role contrasting to his brother who wasn't alcoholic but not a high achiever either. He disclosed that his superior's comparative withdrawal of support had been a severe blow, contrasting to previous encounters with him, when the superior had seemed a benevolent helpful person. IA recognized over time that he felt powerfully and painfully defeated.

While IA appreciated the information of psychotherapy and felt better from session attendance, he frequently had little to say. He asserted adamantly, however, that the sessions were important, coming reliably. I suggested to him, however, that despite idealizing me, he also experienced "resistance," as when he was unable to speak, make emotional connections, or review his past.

As his sessions went on, IA disclosed that he was "workaholic" and that he regularly spent much time in the office to keep up. He was dubious about national professional meetings for this reason. As the sessions went on, however, he continued going to these meetings; I learned indeed that he was in line for national office! -- he was a pioneer in his field. However, when earlier approached about nominations, he had refused repeatedly.

Then the newly distant superior took a job at another company. After this, IA reduced his workaholism, allowed himself to be recognized by his professional organization (shy, he practiced his interactions in the sessions), and found himself then ready to terminate therapy as a self-assured, self-confident person.

I conjecture that he experienced the superior's new indifference as an emotional expression similar to old abuse from his father, especially since he had idealized the superior and was made anxious by communications indicating distance. As a replacement, I was idealized too. The new superior was well known to IA and not idealized, but also not a threat.

With bonding to the superior reduced along with new signals of threat, I conjecture that IA's involuntary subordinate response was activated. With me as ally and then disappearance of the disappointing and implicitly threatening superior, his alpha behavior could come forward with lessened fear of repercussions.

Case of an official's daughter HH became a

patient at age 27 years when her

father--an important official--called the university president demanding his daughter be seen immediately. The oldest of two daughters, she had behaved provocatively, first living as a Lesbian, then as a kept woman of a married man. She currently complained of low self-esteem as well as gynecologic and gastrointestinal distress (with few physical findings). With other specialists too, she had heavily-handedly used power to force help on her terms.

She was hard to interview as she repeatedly interrupted inquiry to ask questions directed at possible flaws in the care provided. She stridently demanded much. But she couldn't define the problem very well, although many complaints centered on her father: he paid too little attention to her; she knew that he had sexual troubles with his wife (her mother); he paid too much attention to her younger sister (aged 21), "a glamour girl."

HH engaged in psychotherapy funded by her father, but participated only twice since her "father was the problem." Six months later, her father called the top administrator in psychiatry with a renewed demand for help. Then himself seeing me along with HH, he surmised that she must have a "chemical imbalance" to be so disturbing: she had moved back to the family home (though paying still for an apartment with a gun in it she reserved for suicide). In the home, she was a tyrant, noisily up all night, her mother kept awake. HH remained in nightwear all day.

Two family sessions then involved not only HH and her father but her mother and sister as well. I focused upon power arrangements within the family. The gun would be removed. Verbal and non-verbal indications of catathetic (put-down) and anathetic (boosting) signals were noted as were power components of sibling rivalry and transgression of generational boundaries. I mentioned that to regain and maintain social rank in the family, attractiveness would be more pleasant and more effective than naked power.

I gave assignments to each family member concerning communications regarding the others. In both sessions, I over and again rearranged seating, so that family members sat according to my perception of needed altered status, aiming at increased propriety. All family members should have optimal say in their own circumstances (e.g., the mother enough sleep, HH to meet her needs without using special means to power, like guns and staying up). In the second meeting, the mood had softened and after it, I sent an identical letter

describing my perceptions to each family member. I outlined measures needed for each to have minimum stress and maximum status. Follow-up sessions were arranged for HH but she called and left a message: "No further sessions were needed"-she had a job, lived apart, things were settled.

In this family, only the mother had seemed involuntarily subordinated (depressed). The father and two daughters each aimed at relative alpha status and were openly competitive-no holds barred-but each had also felt thwarted. Family therapy with me taking charge resulted in each feeling less defeated.

Case of periodic ally-support

EU is 35 years old, a married mother of three boys in monthly treatment for two years for major depression. Antidepressant medication relieved her symptoms of dysphoria, reduced interest, guilt, impaired concentration, irritability, & thoughts of death. Her condition had worsened after moving from afar; though worse off at that time necessitating psychiatric consultation, she had been previously depressed. Prior treatment with some result included counselling individually and with her concerned husband (his preoccupation with business was a problem).

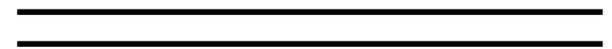
A distorting factor in her development was a loving but rigid, demeaning, and authoritarian father. She was an only child; they lived 10 miles from town with no children near; and she raised animals, influencing her premarital career in veterinary science. Antidepressant medication was discontinued when the couple decided that they would allow a third pregnancy which then happened with no difficulty although intermittent dys-thymia has subsequently recurred concurrent with breaks in monthly sessions.

Typically, sessions include telling me the events of the recent past. Complaints include constraints on her freedom of choice and a sense of being helplessly at the mercy of her husband, children and extended family. She feels a painfully reduced ability to control her circumstances. As the discussion proceeds, the fault shifts from people to schedules (especially her husband's), needs (children), and circumstances. Within the session, that is, her conversation shifts to her from feeling defeated by other people to being more of a participant in sometimes unfortunate circumstances. Her story-line changes: she becomes progressively more in charge and less a victim.

My comments typically elicit details, inquire how she must have felt, and, as the session goes on, express something of my understanding of how she emotionally leads the family. She does this in mothering well, assuring private time for herself and her husband, arranging visits with valued family members, and orchestrating encounters with unsettling relatives.

I believe that the basis of EU's relationships and communicative state (experienced as dysphoria) stemmed from her father (and mother too) who repeatedly and unpleasantly reminded her in many ways of her subordinate status. She had her animals as companions, towards whom she was loving and over whom *she* was dominant; together with the loving parts of her parents that she experienced in addition to the catathetic (put-down) signals, this has helped her deploy appropriate human alpha behaviors which benefits her leadership role in the family, a role shared with her husband but individually distinctive as mother and wife.

Deeply ingrained expectations of involuntary subordination have complicated her adult adjustment. She often experiences automatic renewal of this with a facet of the communicative state felt as dysphoria. Periodic visits to me provide her an ally. Reminders of her *de facto* powerful role also seem helpful.



Geoffrey M, Christensen AV: Psychomotor stimulants versus antidepressants in the learned helplessness model of depression. Drug Dev Research 1993;29:48-55.

Abstract: *Animal models of depression which use stress to induce abnormal behavior generally cannot discriminate antidepressants from drugs which are central stimulants and predominantly stimulate dopamine (DA) neurons. Thus, these models lack pharmacological specificity. The present study shows that the Learned Helplessness (LH) model, applied to Wistar rats, becomes a more valid pharmacological model if registration of the animals' behavior during the interval between each trial of the LH shuttlebox test is added. The DA drugs amphetamine, methylphenidate, nomifensine, apomorphine, quinpirole (specific D2 antagonist), SKF 81297 (specific D1 antagonist), and the antidepressants imipramine, amitriptyline, and isocarboxazide were tested. The results show that the DA drugs had an acute effect*

and increased the number of shuttle box crossings in the intervals between test trials. The antidepressants had no acute effect and did not increase the number of intertrial crossings in the therapeutic dose range. The LH model thus seems to be advantageous when discrimination between drugs with DA psychomotor stimulating properties and drugs with antidepressant properties is needed.

Brown AS, Gershon S: Dopamine and depression. J Neural Transm [Gen Sect] 1993;91:75-109.

Abstract: The dopamine hypothesis of schizophrenia and the emphasis on other neurotransmitters, most notably norepinephrine, serotonin, and acetylcholine, in the pathogenesis of depression, have focused attention away from substantial evidence implicating dopamine in affective disorders. The clinical evidence includes alterations in depressive symptoms with aging (concomitant with possible changes with dopamine metabolism), potential dopaminergic involvement with symptoms of Parkinson's disease and those of depression (including psychomotor retardation and diminished motivation), and potential dopaminergic abnormalities in seasonal mood disorder. The biochemical evidence in patients with depression derives from studies of homovanillic acid, a dopamine metabolite, indicating diminished dopamine turnover. In addition, there is a considerable amount of pharmacologic evidence regarding the efficacy of antidepressants with dopaminergic effects in the treatment of depression. We conclude that dopamine likely contributes significantly to the pathophysiology of depression. However, the role of dopamine in this syndrome must be understood in the context of existing theories involving other neurotransmitters which may act independently, and interact with dopamine and other neurochemicals, to contribute to depression.

Kim S-G, Ashe J, Hendrich K, Ellerman JM, Merkle H, Ugurbil K, Georgopoulos AP: Functional magnetic resonance imaging of motor cortex: hemispheric asymmetry and handedness. Science 1993;261:615-616.

Abstract: A hemispheric asymmetry in the functional activation of the human motor cortex during

contralateral (C) and ipsilateral (I) finger movements, especially in the right-handed subjects, was documented with nuclear magnetic resonance imaging at high field strength (4 tesla). Whereas the right motor cortex was activated mostly during contralateral finger movements in both right-handed (C/I mean area of activation = 36.8) and left handed (C/I = 29.9) subjects, the left motor cortex was activated substantially during ipsilateral movements in left-handed subjects (C/I = 5.4) and even more so in right-handed subjects (C/I = 1.3).

Jonides J, Smith EE, Koeppe RA, Awh E, Minoshima S, Mintun MA: Spatial working memory in humans as revealed by PET. Nature 1993;363:623-625.

Abstract: The concept of working memory is central to theories of human cognition because working memory is essential to such human skills as language comprehension and deductive reasoning. Working memory is thought to be composed of two parts, a set of buffers that temporarily store information in either a phonological or visuospatial form, and a central executive responsible for various computations such as mental arithmetic. Although most data on working memory come from behavioural studies of normal and brain-damaged humans, there is evidence about its physiological basis from invasive studies of monkeys. Here we report positron emission tomography (PET) studies of regional cerebral blood flow in normal humans that reveal activation in right-hemisphere prefrontal, occipital, parietal, and premotor cortices accompanying spatial working memory processes. These results begin to uncover the circuitry of a working memory in humans.

Fuster JM: Frontal lobes. Current Opinion in Neurobiology 1993;3:160-165.

Abstract: The cortex of the frontal lobes is 'motor' cortex in the broadest sense of the word. It is the peak of a hierarchy of anterior neural structures dedicated to the execution of actions. For the temporal organization of movements, the frontal cortex has at its disposal two cognitive functions that complement each other: memory and motor set, i.e., the preparation for movement. Their operation

is especially apparent at the highest stage of the frontal motor hierarchy, which is the prefrontal cortex. Recent microelectrode studies in behaving monkeys reveal that during retention of sensory information for subsequent action, memory and set are supported by two distinct but intermixed populations of prefrontal neurons.

Saito N, Maekawa M: Birdsong: the interface with human language. Brain & Development 1993; 15:31-40.

Abstract: Birdsong is believed to provide the most adequate model for studying the learning process of human language. Songbirds require external song models after birth to learn their songs which contain highly complicated acoustic variables. They memorize their song models as 'templates' in their brains during a particular phase (sensitive phase), whereas vocalization starts in a subsequent step (sensorimotor phase). There may be two song templates: one innate and the other learned. A different nucleus in the song control system of the songbird brain may be responsible for each template. These nuclei are probably analogous to discrete cerebral nuclei in the human language system, including Broca's area.

Rawleigh JM, Kemble ED, Ostrem J: Differential effects of prior dominance or subordination experience on conspecific odor preferences in mice. Physiology & Behavior 1993;54:35-39.

Abstract: Preferences for the soiled bedding of familiar conspecifics were assessed among male mice rendered dominant or subordinate by a series of resident-intruder encounters. Alpha males preferred the odors of their familiar antagonist most strongly. Subordinates, in contrast, showed strongest preferences for unfamiliar females and a weaker preference for alpha odors. When female odors were eliminated from the preference test, alphas continued to show the strongest preference for familiar subordinate odors while subordinates displayed equivalent preference for the odors of familiar alphas and unfamiliar males. It is suggested that the apparently mild preferences of subordinates for dominant conspecific odors reflects fear motivated risk assessment. In contrast, approaches of dominants to subordinate odors seems to be appetitively

motivated. Generally recognizable subordination odors may be useful to unfamiliar males in recognizing exploitable resources.

Garcia-Brull PD, Nez J, Nez A: The effect of scents on the territorial and aggressive behaviour of laboratory rats. Behavioral Processes 1993;29:25-36.

Abstract: [Many] works found in the literature mention odours as an important factor in the development of social lines and the unleashing of aggressive behaviour, but very few authors have studied more deeply the role that these odours play, how they influence behaviour and what the importance of these marks of identity may have. In the present work we analyse social relations presented by laboratory rats (*Rattus norvegicus*, Wistar breed) in seminatural conditions, with special reference to behaviours of dominance, territorialism and aggressiveness, and the importance that these marks of odour play on these behaviours. For this purpose, different individuals (from the established colonies as well as intruders, both males and females and pups) were impregnated with the urine of other individuals and then observed to see whether differences existed in the aggressive behaviour shown towards the intruders by the alpha male of the colony.

From the discussion section: Of all the tests done, the maximum number of bites and lesions were observed in the cases in which the intruder presented a strange male odour.

The results show that odours also play an important role in the establishment of social relations between members of the same familiar group, and that such odours differentiate one animal from another in the colony."

Rosenthal CM, Bennett NC, Jarvis JUM: The changes in the dominance hierarchy over time of a complete field-captured colony of *Cryptomys hottentotus hottentotus*. J Zool Lond 1992;228:205-225.

Abstract: The common mole-rat, *Cryptomys hottentotus hottentotus*, is a social subterranean rodent occurring in colonies in which one female and one to three males are involved in reproduction

and the remaining colony members are non-reproductive. Within each sex the reproductive animals are usually the largest and most dominant animals.

The dominance hierarchy amongst a field-captured colony was linear ($h=0.95$, calculated from Landau's linearity index) soon after capture. The non-reproductive females were ranked low in the dominance hierarchy; many were subordinate to the non-reproductive males. The order of the capture of the mole-rats was not related to the position in the dominance hierarchy. The hierarchy became non-linear ($h=0.56$) after six months in captivity during which two juvenile animals became adult. The breakdown in the hierarchy may result from the lack of opportunity in captivity for animals to disperse and establish satellite colonies, or from colony members becoming co-dominant in the hierarchy as a result of a rise in rank by young animals.

Dominant mole-rats are involved in a greater proportion of interactive behaviours than subordinates. Popularity studies show that females tend to be more popular animals than males. The largest reproductive male was the least popular animal in the first study, whereas a beta male was the least popular animal in the second study period. The reproductive females were the most popular in both periods.

McIntire SL, Jorgensen E, Kaplan J, Horvitz HR: The GABAergic nervous system of *Caenorhabditis elegans*. *Nature* 1993;364:337-341.

Abstract: *Gamma-butyric acid (GABA) is the most abundant inhibitory neurotransmitter in vertebrates and invertebrates. GABA receptors are the target of anxiolytic, antiepileptic and antispasmodic drugs, as well as of commonly used insecticides. How does a specific neurotransmitter such as GABA control animal behaviour? To answer this question, we identified all neurons that react with antisera raised against the neurotransmitter GABA in the nervous system of the nematode Caenorhabditis elegans. We determined the in vivo functions of 25 of the 26 GABAergic neurons by killing these cells with a laser microbeam in living animals and by characterizing a mutant defective in GABA expression. On the basis of the ultrastructurally defined connectivity of the C. elegans nervous system, we deduced how these GABAergic neurons act to control the body and enteric muscles neces-*

sary for different behaviours....

From the body of the article: The GABAergic RME neurons innervate muscles in the head necessary for foraging. During normal foraging the tip of the nose moves rapidly from side to side within a narrow arc of movement.... Killing the four RME neurons by laser microsurgery resulted in worms with an abnormal foraging behaviour described as 'loopy'.... Specifically, flexures of the nose become grossly exaggerated. Thus, the RMEs appear to limit the extent of head deflection during foraging....

Does the connectivity of the RMEs explain the ability of these neurons to attenuate head deflections? The RMEs receive input from putative sensory neurons of the head and nose and like the DDs and VDs, have output to contralateral muscles. For example..., the RMED neuron receives input from the SMBD neuron directly and from the SAAD neurons indirectly. Both of these neurons have long undifferentiated processes that run anteriorly and posteriorly along the dorsal sides of the head, and White *et al* proposed that these neurons provide proprioceptive information about head position. Our results suggest that these putative sensory neurons may act through the RMEs: bending the head towards the ventral side might activate SAAD and SMED as dorsal stretch receptors, which then activate RMED, which in turn relaxes the muscles on the ventral side of the head and restores a straightened head posture. Other sensory neurons may act through the RMEs in an analogous fashion.

Lin S-C, Lin CR, Gukovsky I, Lusic AJ, Sawchenko PE, Rosenfeld MG: Molecular basis of the *little* mouse phenotype and implications for cell type-specific growth. *Nature* 1993;364:208-213.

Abstract: *The molecular basis for the little (lit) mouse phenotype, characterized by a hypoplastic anterior pituitary gland, is the mutation of a single nucleotide that alters Asp 60 to Gly in the growth hormone releasing factor receptor. Detailed analysis of the lit mouse anterior pituitary reveals spatially distinct proliferative zones of growth hormone-producing stem cells and mature somatotrophs, each regulated by a different trophic factor. This sequential growth factor requirement for a specific cell type may exemplify a common strategy for regulating cellular proliferation in other mammalian organs.*

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2. c/o R Gardner, 4.450 Graves Building (D28), University of Texas Medical Branch, Galveston, TX 77555-0428. FAX: 409-772-6771. For ASCAP Newsletter Volumes 3 (Jan through Dec, 1990), 4 (same months, 1991), and 5 (same months, 1992), please send \$18 (or equivalent) for each 12 issue set. The first two volumes (1988 and 1989) of thirteen and twelve issues respectively are available on request without cost. For subscription to the 1993 set of 12 issues (Volume 6), the cost is \$20/year. Make checks or money orders out to "Department of Psychiatry and Behavioral Sciences, UTMB."
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