

# ASCAP

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June 1995

*"It's often when you're talking over things that you seem to see your way clear. Your mind gets made up for you sometimes without your knowing how it's happened. Talking leads to a lot of things one way or another."*

*Mary Drower, a character of Agatha Christie<sup>1</sup>*

## Across Species Comparison and Psychopathology (ASCAP) Newsletter Aims

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

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## ASCAP Society 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 psychopathologically related states. We are interested in the integration of various methods of study ranging from cellular processes to individuals in groups. The ASCAP Newsletter is a function of the ASCAP society.

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# ADDRESSED TO & FROM

## **JUNE 27th SCHEDULE**

A brief recap of the meetings planned for the second annual ASCAP Society meeting to take place in Santa Barbara, June 27th, 9:00 a.m. to 5:00 p.m. at the Best Western South Coast Inn, 5620 Calle Real Santa Barbara/Goleta, CA 93117, Tel: (800) 350-3614 or (805) 967-3200 Fax: (805) 683-4466 for room reservations.

### **Session 1: 9:00-10:30 a.m.**

#### **Topic: Perspectives**

- History of ASCAP
- Cognitive-behavioral movement and parallels to the "need for basic science"
- Sociophysiology
- Basic plans
- Formal algorithms, e.g., anorexia nervosa
- Data sources

### **Session 2: 10:45 a.m.-12:15 p.m.**

**Topic: Aaron T. Beck ASCAP Award** presentation, award and paper by Nicholas Allen, Ph D.

### **Session 3: 1:15 - 2:15 p.m.**

**Topic: Discussion of D. G. Freedman's development of IWM** in February ASCAP: discussion of it and the reactions to it in subsequent issues

### **Session 4: 2:30-5:00 p.m.**

#### **Topic: ISS**

- Resident-intruder animal model
- Birtchnell vertical-horizontal schema
- Hypothesis-testing

- Sloman book update

**Business Meeting: 5:00 p.m.**

## **RESPONSES TO FREEDMAN**

I am enclosing my (525-word) commentary on Dan Freedman's ISHE address as published in The ASCAP Newsletter. 500 words is damn short, you know!! I have a whole other response along a totally different line that I think is equally important (attachment variability as a special case of environmentally-contingent variation in strategy). I certainly am looking forward to reading what other people have to say! See you in Santa Barbara.

Linda Mealey  
Collegetown MN, USA

## **RESPONSE TO BAILEY & ROSWELL**

A newcomer to ASCAP and to evolutionary theory, I am finding the Newsletter fascinating and stimulating, not to mention challenging in regard to concepts and language as yet foreign to me. Despite my newness ~ or perhaps because of it! -- I submit the following comments and questions.

As a mental health practitioner, I was particularly interested in the Anorexia Nervosa article by Kent Bailey and Linda Roswell (ASCAP, December 1994). Anorexia seems an excellent choice of disorder to profile from an evolutionary

stance since the etiology is widely accepted as being bio-psycho-socio-cultural.

However, it should be noted that much of Bailey & Roswell's description and discussion in regard to anorexia pertains primarily to one subtype of the disorder, i.e., the restrictive type, in which individuals consistently restrict food intake and do not experience periodic episodes of binge eating. This form of the disorder affects approximately 50% of the anorexia nervosa population. The other half of the anorexia population does periodically engage in binge eating. Significant differences exist between the restricting group and the group with the periodic binge eating symptom. Examples of these differences are in areas of self-discipline and impulsivity, concern with sexual attractiveness, sexual experience, relationships with family in general and with the father in particular, alcohol and drug abuse, stealing, sleep disturbance, personality factors, etc.

Thus it does not appear, for the bingeing population, to be simply a matter of biology occasionally winning out over culture. Or then again, does it? What is the evolutionary view/explanation of the differences between these two subtypes of anorexia nervosa? Further, I am wondering if, and how, the authors would incorpo-

rate the above differences into the given component ratings of their model?

Bailey & Roswell state that the component ratings given in Table 2 are for early phases of the condition. What constitutes an early phase and a late phase? What differences do they foresee in ratings for late phase anorexia nervosa? And do the authors see the ratings as being equally applicable to a) non-western, non-white individuals, and b) to males with anorexia nervosa? In regard to the components themselves, would the neoculture items be eliminated when dealing with more primitive cultures?

Without the benefit of answers to the above questions, it would seem Bailey & Roswell's model could be highly useful in plotting data to identify subgroups and corresponding themes. For instance, in addition to the restrictive and bingeing subtypes of anorexia, there is preliminary evidence that different ages of onset (in the US at least) may have differing triggers and issues. Cross-cultural studies of the disorder in non-western cultures are minimal; future studies utilizing Bailey & Roswell's component ratings could possibly help highlight unique emphases or patterns common to a particular culture.

Finally, as a therapist I would find case studies with accompanying ratings instructive in the utilization of profiling with individuals. I look forward to future discussion and

eventually seeing the formal criteria for component ratings published in ASCAP.

Pat Neuman  
Moorhead MN, USA

### **INTRODUCTIONS**

My own interest in social rank and depressive processes began as a graduate student at McGill University. During my clinical internship at the Clarke Institute I have had the pleasure of meeting Stephen Swallow here at the Clarke Institute who has passed a number of earlier issues of the Newsletter on to me. It was my pleasure to enter one study from my doctoral thesis to the Aaron T Beck Essay Contest sponsored by ASCAP.

As of this September, I will be on faculty at Dalhousie University in Canada where I hope to continue this research on social rank, depression and interpersonal behaviour.

Darcy Santor  
Toronto ONT, CANADA

### **INTEREST IN ASCAP**

I am writing in response to Russell Gardner's letter of November 15, 1994, in which he enclosed a paper by Professor Kent Bailey and asked if I would like to comment on it in The ASCAP Newsletter. I would like to apologise for not replying sooner. I read the paper when it first arrived. It seemed rather good to me. I had hoped to make some comments on it, but I am very busy, and I have limited resources, so I never got around to putting something together that

would make a reasonable comment on the paper.

I would like to learn more about ASCAP and the work that you all are doing. I am enclosing a bit of information that tells something of what we are trying to do in evolutionary psychology at Simon Fraser. [Editor's Note: Look for this in a future issue.]

Charles Crawford  
Burnaby BC, Canada  
Charles\_Crawford@sfu.ca

### **ERRATA (i)**

Some readers may be wondering, "What are evolutionary perks?" (page 10, paragraph 4 of The ASCAP Newsletter. February 1995). It should read "peaks". Also on page 10, column two, paragraph 2, line 2, the sentence should read: "Furthermore, there is the probability that some group differences are genetically based ...". Otherwise, you did a fine job and I thank you very much.

Daniel Freedman  
Las Vegas NM, USA  
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### **ERRATA (ii)**

We regretfully realized, on entering John Price's electric fish article this month and finding an overage of references, that references to Dr Price's shrew article of last issue had become mixed up with those of the electric fish of this issue. We apologize for this oversight, and have included the full complement of the shrew references in this month's issue.

Editors  
ascap@beach.utmb.edu

# **ARTICLE:** Response to Freedman

by J Birtchnell

I have always had difficulty with Bowlby's concept of the Internal Working Model (IWM). It seems so imprecise, and why did he call it a "working" model? It worries me that Freedman is willing to assume that the internal working of a human brain is comparable to that of a goose brain. Imprinting is a simple mechanism to ensure that goose and gosling are kept in close proximity. The behaviors which promote the mating of birds may indeed be similar to imprinting, but what occurs between the human infant and its mother and between mating humans involves mental mechanisms not available to the goose.

The puppy experiments were interesting, but the observer of the later behavior should have been blind to the early training. If the training had been done by rewarding desired behavior, it could have been a uniting experience. Does a young puppy understand what "no" means? It is not made clear how many times the pups were hit, but it would not be surprising if they were later wary of a human that had repeatedly hit them. One cannot conduct experiments of this kind on humans, and studies which rely upon adults' recollection of childhood experiences are fraught with difficulties.<sup>1</sup>

Freedman maintains that IWMs are established early in life. He begins and ends his article with the assertion that, once established, they are extremely resistant to change. This is a bold statement which is reminiscent of the psychoanalytic argument that the most early experiences are the most influential. Where is his evidence for this? (Where indeed is the evidence for the psychoanalytic argument?) From what he has written in his penultimate paragraph, the term IWMs could be replaced by the word experiences. I know of no evidence that early experiences have greater impact than later ones.

The statement that first experiences with parental figures cause permanent neuro-physiological changes in the chick does not necessarily mean that internal representations are "neurologically fixed". What does the word "permanent" mean here? Do not

subsequent experiences also cause neuro-physiological changes, and do not these modify the earlier changes? What of a daughter who is raped by a previously loving father? Surely all significant experiences cause such changes. How else do we have memories?

Bowlby wrote about secure attachment, but not about secure distance. Closeness, the ability to become involved with others and distance, the ability to become a separate and distinct individual, are equally important. I was interested to read that Arab mothers were judged to be more intrusive and more discouraging of the child's independence. This I would consider to be preventing the establishment of distance. The quotation from Zeanah implies that self-reliance and self-organization are unfortunate consequences of parental rejection. In fact the good parent encourages them. My other complaint about attachment is that it is a hybrid concept, combining closeness with lowerness. If we are talking basic plans then my own system which separates out the closeness-distance and upperness-lowerness axes is more comprehensive.<sup>2</sup>

Evolutionary ideas undoubtedly play a part in explaining human relating behavior, but such ideas have to be carefully thought out. We must never forget that the relating behavior of humans is vastly different from that of any other species, even that of our closest ancestors. We must be extremely cautious about drawing parallels between the relating behavior of animals and that of humans. When considering the effects of childhood experiences we must remember that humans remain immature for a much longer period than do most other animals and that human maturation processes are much more complex.

Might I say that I like the psychoanalytic concept of internalization. We have internalizations of ourselves and of others. I would guess that some animals also have internalizations, but not as refined as ours. Unlike animals, we have an internalization of God,

who is probably an amalgam of other internalized figures, particularly upper ones. God must have begun as an internalized other and later become externalized. He serves important functions for humans, both internally and externally. For some He

is kindly and loving, for others He is harsh and punitive, but since He himself is internalized, I do not see how He can help us overcome IWMs.

*References: page 22*

## **ARTICLE:** Internal Working Models: Cause, effect or covariate?

*by L. Mealey*

Freedman's experimental study of the social development of puppies was one of the first studies to demonstrate the unequivocal importance of, and to some extent, the imperviousness of, inherited "personality" traits. Although we cannot do the same elegant experiments with human children, behavior genetic studies suggest a similar (i.e., powerful) role of genetics in the development of human personality, especially as related to the variables Freedman assessed in his puppies - impulsiveness and social style.<sup>1</sup> So my first question is: to what extent is personality and social style really a consequence of parenting as opposed to a correlate of parenting which is mediated through the genetic similarity of parents and offspring? My guess is that the main effect of inborn temperament is much larger than the main effect of parental style, and that children with different genotypes will have different perceptions of the same experiences.<sup>2,3,4</sup>

My second question is a chicken-and-egg question: regardless of the relative size of the contributions of nature and nurture to childhood and adult personality, is the IWM a truly "working" model (algorithm), or is it just a phenomenological interpretation of the world based on one's own behavior? That is, is our behavior really a product of our accessing of our private IWM to make decisions (however non-conscious the process may be), or do we construct our IWM *post facto* as a way to explain the world (in terms of attribution theory)?

The answers to the first two questions have profound implications for answers to the third, which is: can one change a person's IWM and then expect a

consequent change in behavior?

I am particularly interested in this question as it relates to the evolution and development of sociopathy.<sup>5</sup> It seems clear that both the sociopath and the psychopath have different working models of human social interaction than do socially "well-adjusted" individuals. These "attitudes" and their correlated behaviors are indeed found to covary not only with one another but also with circumstances of rearing. If we have as one of our goals, a reduction of the incidence of psychopathy and sociopathy, then we need to ask ourselves at what point in development should we intervene, and at what level. Is the most effective intervention going to be prenatal? Or, at the other end of the spectrum, would it ever be possible to reverse a life-long history of antisocial attitudes and behaviors? Is a particular IWM inevitable for some genotypes regardless of environmental inputs? Or can we prevent the development of pathological IWMs by intervening at the level of the family? Once an IWM is in place, is it immutable? And if not, can changing an IWM change behavior as well?

The retrospective and correlational studies that typify the attachment literature do not shed any light on these important questions. Only further experimental studies (such as say, cross-fostering of basenjis and terriers!) or controlled studies of clinical interventions will advance this topic from the realm of the hypothetical into the realm of the practical.<sup>6</sup>

*References: page 22*

# ARTICLE: Sundry matters

by J Birtchnell  
janet:dmju308@uk.ac.ulcc

I was interested in your reprinting Tim Miller's article about the big five (ASCAP, January 1995), because I have just sent off my draft chapter for Robert Plutchik's book and the chapter is about fitting the ten DSM-IV personality disorders into the interpersonal octagon. I know that the big five is attracting a considerable literature but I find it a most unsatisfactory classification. I would like the reference to the assertion that the interpersonal circle is a subset of the big five. I would certainly not consider the interpersonal octagon to be. For one thing, four of the big five, neuroticism, agreeableness, openness to novel experiences and conscientiousness, are intrapersonal rather than interpersonal qualities. That only leaves our old friend extraversion to carry the whole interpersonal

load, and that leaves a

lot to be desired. I

presume that the five

factors are really five

bipolar dimensions,

which creates ten

opposite attributes, so that accounts for introversion as well. I would have written a response to the article, but I am a bit pressed for time at the moment. Meanwhile I would like to bring my own theoretical system to Tim Miller's attention. I am aware that he would answer: "Where are your data?" I could only say at present: "I'm getting there."

Over the past couple of weeks I have been producing some psychometrics on my instrument (the PROQ). While, in general, it stands up quite well, there are one or two places where it needs revising. I will shortly be in a position to produce a revised version (replacing a quarter of the original items) which I will call the PROQ2. I wish eventually to get lots and lots of people to complete. The trouble at present is that there is only one paper published on it, and that is about using it in a particular study rather than introducing it as an instrument.<sup>1</sup> What I really need is to put all the psychometrics together into another paper and that is what I hope shortly to do. People who might be tempted to use it are those

who want a measure of relating rather than a measure of symptoms. If they also have a symptom measure so much the better. I have two studies of before and after measures of patients undergoing psychotherapy on the go at present and I am hoping to get others of this kind started soon. I have got a colleague collecting cases in Broadmoor, our institution for the criminally insane. I have high hopes of getting it used in a therapeutic prison shortly. The above quoted study used it with patients with DSM-III major depressive episodes. Any kind of specifically defined clinical group would be useful, e.g., manics, schizophrenics, alcoholics.

You continue to challenge me to fit my thinking into

brain mechanisms. I

confess that brains,

being things, do not

greatly interest me. My

major preoccupation is

with people. I wrote a

paper called "Interrelat-

ing. A journal referee responded to the following statement which I made. I wrote "Somewhere within the nervous system there must be a monitor which registers the level of the stores of each state of relatedness and generates a sensation of hunger which provokes the individual into appetitive behavior." The assessor wrote: "The 'must' here is a curious word to use. Why must it? It seems to me that this doesn't even stem self-evidently from the theory proposed, but more importantly remains an untested (and probably untestable) assumption which is not treated at all critically. The next paragraph makes similar claims about "the innate inclinations" to the four states of relatedness which probably exist. How do we know this? The issue here is the uncritical stance of the author. He develops his arguments as though they were self-evidently correct." However, undeterred, John Price and I had a discussion about what I have started calling the inner and the outer brain and we both felt that something should be written about this somewhere.

*... I wish eventually to get lots of  
people to complete PROQ2...*

# ARTICLE:

by J Price

## Report on Birmingham Group

Last weekend we had a Birmingham group meeting down at Anthony Stevens' place in Devon, so I am able to report some news to you. First of all, it is a really lovely place, an old house in enchanting grounds, and all on the edge of the moors.

We had three sessions. In the first, Chris Knight presented his views on the evolution of language and the development of culture. He puts a lot of emphasis on the organisation of the female members of the group, to which he thinks synchronisation of menstruation and concealment of ovulation were contributory factors. He thinks that women organised themselves to drive men out to hunt and refused sex until they were offered meat. Language was needed in both its forms for this. Manipulative language was needed to convey to the men that there was no sex without meat, and this language was loud, strident, repetitive, metaphorical and ritualised, as with other forms of manipulative communication. Then cooperative communication, or what he calls "conspiratorial whispering", was needed to organise the "sex strike" in the first place, and to ensure that no strikebreaker allowed the men to have sex and to loll about without bothering to hunt - hence the first derogatory epithet was "whore" (now often reproduced in auditory hallucinations). This seemed an interesting line of thought, and we were amazed at the paucity of available information about the synchronisation of menstruation. A male block?

The second speaker was Conrad Kortmulder from Leiden - a comparative ethologist working with fish. He is particularly interested in symmetry, and the various ways there are of breaking symmetry. I felt his work to be very close to my own interest in the switch from symmetrical to complementary relationships.

In the third session we returned to the two modes, and discussed the paper already sent you (see future issue). I was not able to convince people that the relationship between an executioner and his victim could be entirely hedonic, since it did not address itself to their relative rank, which was usually accepted without question, regardless of the rather exceptional roles they both play. As a result, I am sending you a slightly amended version in which I have toned the executioner bit down, and also responded to Anthony Stevens' request that we append a statement that although the hedonic mode may be defined in terms of competitive behaviour, it is typified by affiliative behaviour. Apart from these minor points, we now have agreement on the text of my paper, so I hope it will be possible to put it into ASCAP together with David Stevens' historical review. It would then be very useful to get some comments from readers, particularly from those in different disciplines such as social psychology, to say how the mode concept compares with their own theoretical schemes.

# ANNOUNCEMENT...

by K MacDonald  
kmacd@beach1.csulb.edu

I announce the publication of my book, "A People That Shall Dwell Alone: Judaism as a Group Evolutionary Strategy" published under the Praeger imprint of the Greenwood Publishing Group. The book is in the series "Human Evolution, Behavior and Intelligence" under the editorship of Seymour Itzkoff. Ordering information is at the end of this posting.

The book attempts to develop an understanding of Judaism as a group evolutionary strategy. The basic proposal is that Judaism can be interpreted as a set of ideological structures and behaviors which have resulted in the following features:

- The segregation of the Jewish gene pool from the surrounding gentile society.
- Between-group resource and reproductive

competition.

- High levels of within-group cooperation and altruism among Jews.
- Eugenic efforts and socialization efforts directed at producing high intelligence, high investment parenting, and commitment to group rather than individual goals.

### **Overview of the book**

Chapter 1 develops the basic theoretical perspective of the book, including especially the idea of a group evolutionary strategy. Group evolutionary strategies are proposed to be theoretically unconstrained on a variety of dimensions, and the remaining chapters flesh out the specific characteristics of Judaism as a group evolutionary strategy. Group strategies are viewed as experiments in living which can be developed and maintained by purely cultural processes, although a later chapter discusses variation in evolved systems which may well predispose individuals to form cohesive, genetically exclusive groups. Of critical importance are within-group social controls and their rationalizing ideology which 1) effectively limit exogamy; 2) enforce cultural segregation; 3) promote within-group charity and economic cooperation; and 4) structure mating opportunities within the group in a manner which ensures that there will be eugenic and environmental pressures directed at developing phenotypes (especially intelligence, resource acquisition ability, high investment parenting, group allegiance) ideally suited to fulfilling certain ecological niches within human societies or necessary for maintaining group commitment and cohesion.

Chapter 2 discusses the evidence from modern studies on population genetic differences between Jews and gentiles. This material is relevant to the hypothesis that Judaism represents a group strategy which is fairly (but not completely) closed to penetration from gentile gene pools. The data indicate that Jews have remained genetically distinct from the groups they have lived among despite having lived among them for centuries. In addition, Jewish populations in very diverse areas have significantly more genetic communality than is the case between Jews and the gentile populations they have lived

among for centuries.

Chapter 3 discusses some preliminary issues which are important for the general theory that Judaism can be viewed as a group evolutionary strategy. There are three purposes of this chapter. Evolutionary anthropologists have found that stratified societies tend to be characterized by polygyny of wealthy males. The society depicted in the writings of the Tanakh (i.e., the Old Testament) conforms quite well to this expectation. There is indeed ample evidence for reproductive competition and that intensive polygyny was practised. Evolutionary anthropology also emphasizes the importance of endogamy and kinship for understanding human societies. The second purpose of this chapter is to show that there is a pronounced tendency toward idealizing endogamy and condemning exogamy apparent in these writings. The importance of consanguineous marriages and extended kinship relationships is also very apparent in these writings, especially for understanding the activities of the patriarchs. Finally, and perhaps most important to the present undertaking, it is shown that much of the ideology of Judaism as an evolutionary strategy for maintaining genetic and cultural segregation in a Diaspora context is apparent in the writings of Priestly stratum of the Tanakh. There is scholarly agreement that this material was written by Israelite priests during the period of the Babylonian exile. It is proposed, therefore, that Judaism as an evolutionary strategy dates from this period (6th-5th centuries B.C.).

Chapter 4 discusses the manner in which Jewish religious ideology and practice have facilitated the genetic and cultural separation of Jews and gentiles, and is thus relevant to the hypothesis that Judaism is a self-chosen, genetically fairly closed evolutionary strategy. Of the hundreds of human groups in the ancient world, Judaism was the only one that avoided the powerful tendencies toward cultural and genetic assimilation characteristic of Western societies. Judaism as a group strategy depends on the development of social controls reinforcing group identity and preventing high levels of genetic admixture from surrounding groups. This genetic separation has been maintained by a variety of cultural



practices: religious practices and beliefs, language and mannerisms, physical appearance, customs, occupations, and living in physically separated areas which were administered by Jews according to Jewish civil and criminal law. All of these practices date from very early stages of the diaspora. This chapter surveys these ideologies and behaviors with a particular emphasis on their role in severely limiting the numbers of gentile converts to Judaism and preventing intermarriage between Jews and gentiles.

Chapter 5 reviews evidence for resource and reproductive competition between Jews and gentiles, as well as for the proposition that anti-Semitism has been strongest among gentiles most in competition with Jews. Evidence is reviewed indicating that Jews were commonly utilized as an intermediary group between a ruling elite (and especially alien elites) and the native population. In these situations the elite gentile group actively encouraged Jewish economic interests to the detriment of other sectors of the native population. After summarizing data on this type of relationship in widely dispersed parts of the world and widely separated points in time, separate sections are then devoted to Jewish/gentile resource and reproductive competition in a wide range of economic activities in Spain prior to the Inquisition, in early modern Poland, and in Europe and America following Jewish emancipation.

Chapter 6 discusses data indicating the importance of kin-based cooperation and altruism within Judaism, its role in resource competition with gentiles, and its importance in maintaining cohesion within the Jewish community. Data are presented indicating that Jewish economic activities have often been characterized by a high degree of nepotism and within-group charity which is central to conceptualizing Judaism as an evolutionary strategy. Group rather than individual interests have been of primary importance throughout Jewish history, so that, e.g., there were sanctions on individual Jews to ensure that the total resource flow into the group was maximized rather than allow individual Jews to maximize their resource acquisition.

Further, it is shown that within-group charity and altruism have been facilitated by strong social controls within traditional Jewish communities which enforced a high level of within-group altruism. Traditional Jewish communities were also characterized by strong social controls against Jews who cooperated with gentiles against Jewish interests or who patronized gentile businesses or aided gentiles in economic activities. Finally, data are discussed indicating that there were limits on within-group altruism among Jews. Although altruism toward poor Jews was an important aspect of Judaism, there was also discrimination against poorer Jews, especially in times of economic and demographic crises. There was also discrimination between different Jewish groups as recipients of altruistic behavior as a function of genetic distance.

Chapter 7 discusses hypotheses related to the issue of whether Judaism constitutes an ecologically specialized evolutionary strategy. The following five propositions are of interest: 1) Judaism can be characterized in ecological terms as a high investment reproductive strategy which facilitates resource competition by Jews with the gentile host society. 2) Success in mastering the vast and complex Jewish religious writings was strongly associated with prestige within the community and was ultimately linked rather directly to control of resources and reproductive success. 3) Jewish religious and social practices fostered the development of high investment patterns of childrearing necessary for successful resource competition and a role in society above that of primary producer. 4) Judaism has been characterized by assortative mating, and cultural and natural selection for intelligence and other traits related to obtaining resources within stratified human societies; data are reviewed indicating that Jewish populations have a higher average intelligence than their gentile counterparts, as well as a number of other demographic markers indicating that Jews as a group engage in high investment parenting. 5) Jewish groups have been characterized by a set of practices aimed at socializing individuals into identifying strongly with the group and excluding individuals (and their relatives) who depart from group goals - the latter practices ultimately having a

eugenic effect on psychological mechanisms predisposing people to participate in highly cohesive, collectivist groups.

Finally, Chapter 8 discusses the origins of Judaism as a group evolutionary strategy. As indicated above, part of the argument in Chapter 1 is that evolutionary group strategies need not be viewed as determined by ecological contingencies or evolutionary theory. Group strategies are viewed as experiments in living which can be developed and maintained by purely cultural processes. Chapter 8 modifies this perspective by suggesting that a threefold combination of historically contingent factors facilitated the development of Judaism as an evolutionary strategy: 1) A strong predisposition to ethnocentrism characterizes Middle Eastern cultures generally; it is argued that this predisposition is genetically influenced, but that the tendency toward ethnocentrism has been exacerbated as a result of selective effects resulting from Jewish cultural practices; 2) Unique historical experiences (including especially the sojourn in Egypt recounted in the Biblical books of Genesis and Exodus) showed that a diaspora strategy could be successful; and 3) The unique early organization of the Israelite tribes resulted in a powerful class of priests and Levites whose status depended on their genealogy and whose own individual interests were intimately bound up with the fate of the entire group.

These individuals benefited most from the group strategy which ultimately evolved into historical Judaism.

While clearly of great interest in its own right, the present endeavor should be viewed as a necessary prologue to an attempt to developing an evolutionary theory of anti-Semitism. A second volume in this project, "Separation and Its Discontents: Toward an Evolutionary Theory of Anti-Semitism" (scheduled to be published by Praeger in 1995), will extend this paradigm to develop an evolutionary/psychological theory of anti-Semitism based on an evolutionary interpretation of social identity theory and the psychology of individualism/collectivism. This volume reviews historical data on Jewish/gentile interaction in a wide range of historical societies, including an emphasis on gentile anti-Semitic strategies as well as Jewish strategies for combatting anti-Semitism.

"A People That Shall Dwell Alone: Judaism as a Group Evolutionary Strategy." ISBN# 0-275-94869-2 C4869. Price: \$57.95 (too much, but I'm not in charge of pricing). Greenwood Publishing Group, 88 Post Road West, PO Box 5007, Westport CT 06881-5007. Information fax number: 1-800 474-4329. Information phone number: (203) 226-3571. Credit card orders: 1-800 225-5800.

## **ARTICLE:** Electric fish: A harmonious model for asymmetrical relationships

*by JPrice*

When I wrote to ASCAP about electric fish, and later about authoritarian personality,<sup>1</sup> I little thought that I would soon be sitting down and writing about authoritarian personality in electric fish. And yet, having got more fish material from the library, that is what I find myself doing. Let me start with some general information about the evolution of electric fish.<sup>2</sup>

### **Evolution of electro-receptivity**

It is thought that electro-receptivity evolved several times and shows parallel evolution. Most cartilagi-

nous fishes are electroreceptive. Only two lineages of bony fishes are, and they are the African mormyrids and the South American gymnotiforms, both being freshwater fish and therefore likely to be very distant relations. Evidence from the receptor organs and brain nuclei suggests that these three lineages developed the capacity independently, but in each case from the tissues of the lateral line system.

They all have ampullary organs which are used to

detect external electric fields (such as those given off by prey), and the fields created when the fish moves in relation to the earth's magnetic field. Only the bony fish have tuberous organs which are used to receive their own electric organ discharges (EODs) and those of conspecifics, and these are adapted to receive only the frequencies that it has been adaptive for them to receive during evolution.

### Evolution of electrogenesis

The capacity to create electric fields in the surrounding water is also thought to have evolved several times. Bullock says "... *it appears most likely that electric organs were invented repeatedly, independently, in species already possessed of electroreception, in unrelated orders of elasmobranch and teleost. Only in one case, the stargazers (Uranoscopidae), is it doubtful whether electroreception coexists with the electric organs... nothing is known about electroreception in invertebrates, reptiles or birds*" [it occurs in urodele amphibians and one mammal (the duck-billed platypus)].<sup>3 p.670</sup>

There are two distinct forms of weak EOD, wave forms and pulse forms, and both occur in both African and American families. Strong EODs are used for stunning and killing prey, and for defence, and they occur in the torpedines. The weak EODs are used for navigation and communication. The receptors detect alterations in impedance in the electric field, and they can distinguish whether such alterations are due to capacitance or resistance, so these fish have the capacity for "seeing" an environment which would be very strange to us.

The electric organs are evolved from striated muscle (which has lost the capacity for contraction). Therefore the discharges can be abolished with curare (very useful in experimentation). Larvae also have electric organs, which may or may not be homologous with the adult forms. Most organs are developed from trunk musculature and are innervated by spinal electromotoneurons, but some are developed from the extraocular muscles and innervated by cranial nerves. Some fish have accessory electric organs which may discharge at a different rate from the main organ. One group (*Apteronotidae*) has a

"neurogenic" organ developed from spinal motor nerves (probably from the nerves which innervate its larval myogenic organ) and this can reach a frequency of 1,700 cycles per second (and of course it is not affected by curare). One fish has an electric organ developed from sensory nerves.

### Sex differences in frequency

In wave form species (which emit an almost sinusoidal wave of alternating current) the frequency of the discharge is the most important information. There is a tonic or background frequency which is used for species, sex and possibly individual recognition. This is given off 24 hours a day, so the electric fish is *par excellence* an individual who "cannot not communicate". In some species, the frequencies of the two sexes differ but overlap, in most cases the male has a lower frequency, but in a few species the female has a lower frequency. It is interesting that when the males have a lower average frequency, the male will only mate with a female having a higher frequency, even though many of the females it meets have a lower frequency.

### Wave form and sex hormones

In many species the wave form of females differs from that of males, and this is due to the nature of the electrocytes in the electric organ, and to their arrangement and their number. In most of these cases the female wave form can be converted to the male form by androgens (by changing the electrocytes into male form) and in these cases the electrocyte is a target tissue for androgens like the syrinx of songbirds and the penile bone of the rat. Wave forms which do not differ between the sexes are not affected by androgens. In some cases when males are kept in captivity, their EOD wave forms alter to the female type, and this may reflect a change in sex, since we know that sex in fish is often socially determined.

### Frequency modulation and agonistic behaviour

Modulation of the tonic frequency is used in both reproductive and agonistic behaviour. Short interruptions in the tonic discharge (< 1 second) are used as threat displays and courtship displays; they may cause rivals and subordinates to flee. Long interrup-

tions (> 1 second, extending to total electrical silence) serve as submissive displays, and reduce attack by rivals and dominants. These conventions apply to both pulse and wave forms of both mormyrids and gymnotiforms, in fact to all electric fish except the Apterontoids (which have the neurogenic electric organ) and so represent a remarkable case of parallel evolution.

Short increases in frequency (< 1 second) of 10 to 50 Hz also act as threat signals, while long rises (5 to 40 seconds) of 2 to 20 Hz signify submission. It is not known how the significance of rises differs from that of interruptions. Other threat signals in electric fish are antiparallel swimming and head butting.

### **Frequency and social rank**

In those species of electric fish which form social hierarchies, frequency also varies with dominance. In some species the dominant fish has a higher frequency, in some species lower. In the latter, if a fish becomes dominant, its frequency becomes lower. In some species in which dominant males have lower frequencies than other males, dominant females have higher frequencies than other females.

When two fish of the same species are paired together, they tend to develop frequencies which differ by exactly an octave.<sup>4 p.514</sup> So far this has only been reported for opposite sexed pairs, so it is not known whether it is a reflection of dominance relations or pair bonding. Nor is it known how the regulation is achieved. However, the formal similarity to the adjustment of RHP in complementary marital relationships is striking:<sup>5</sup>

*What seems more likely, from what we know clinically, is that the "one-up" husband (or wife) tries to keep his spouse's exercise of control [RHP] a constant amount below his own exercise of control [RHP]. What is maintained homeostatically is not the absolute level of control, but the difference in control between husband and wife, what might be called the "control gap" [RHP gap].*

*More generally, the "one-up" spouse maintains a gap on what Birtchnell has called the "vertical dimension"*

*which describes a number of correlated variable such as mood, rank, self-esteem, self-confidence, dominance, and, in the last resort, the capacity to define the relationship rather than accept the definition provided by the other.<sup>6</sup> Colloquially, we might say he tries to maintain a constant level of "one-upness"; more technically he tries to maintain a constant vertical-gap setting between what he feels to be his own position on the vertical dimension and what he perceives his wife's to be. This "gap" model has the advantage of embracing the phenomena of redirected aggression; if the husband's mood is lowered after receiving punishment from his boss at work, he restores the vertical gap at home by putting his wife down (or omitting to boost her). The feedback loop is probably below conscious awareness: even though he may be aware that he is putting his wife down, he does not understand why he is doing it; and many signals intended as boosting signals are received as putting-down signals, especially in the case of "constructive" criticism.*

I am not sure how many situations there are in which one vertebrate compares itself with a conspecific, and then makes a decision which depends on the comparison. There is the comparison of RHP which determines the decision whether to attack or flee in agonistic behaviour, and this is widespread among vertebrates. Then there are these two instances in electric fish, the jamming avoidance response which I discussed last time, and this pair-bonding situation, in which a fish either selects another with a complementary frequency, or creates a desired frequency gap by altering its own or its partner's frequency. And there is mate selection in the herring gull, which, substituting size for frequency, is similar to mate selection in the electric fish. Tinbergen observed in herring gulls that, although the range of sizes of male and female overlapped considerably, he never observed a mated pair in which the female was larger than the male.<sup>4</sup> This means that the gulls must compare their sizes during courtship, and desist if the female is larger than the male.

Is there a basic vertebrate plan for self-other comparisons, which has been drawn on for all these four, and possibly other, comparisons? Or did the self/

other comparison evolve separately in each situation? We can do no more than speculate. In the case of RHP and size in gulls, there could well be a common comparison process, as the RHP comparison may well have started off as a simple size comparison. But it is less likely with the electric fish, in which the whole plan for electrogenesis and communication by electric fields evolved independently (our own ancestors are thought to have been electroreceptive but not to have had electrogenetic powers). It is more likely that the capacity for self/other comparison evolved as part of this new system, rather than that an existing self/other comparison system was brought in from somewhere else in the brain, rather as someone developing an aeroplane might have used an engine designed for powering a car.

Of course RHP does not work like the harmonic scale, so there is no obvious size of RHP gap to match the octave of frequency gap. In fact, the variability of RHP gap is probably important, in that it is likely to vary with the "insecurity" of the dominant authoritarian partner. The more secure he feels, the less gap he needs. Therapeutically, this means that one can aim at reducing the gap, short of achieving total symmetry. One could not do this with electric fish, because the system would tend to return the gap to the octave (perhaps one could reduce a gap from two octaves to one octave!). Means of reducing the RHP gap involve educating the dominant partner that gap reduction brings benefits rather than costs: his more powerful wife will use her power to further his interests rather than her own competing interests; a more sociable wife will use her capacity to cultivate his friends rather than fill the house with her own; a more highly sexed wife will increasingly satisfy him rather than give her favours to others (etc., etc.).

For completeness, to the above one must add two categories of self/other comparison with which we are very familiar in humans. There is comparison of what Paul Gilbert has called social attention-holding power (SAHP), in which the comparison asks the question, "am I more attractive than he/she?" in the hedonic competition for prestige. And there is the group membership comparison which asks the

question, "Is he/she the same as me?". This latter comparison occurs in insects and rodents in which groups of the same species differ in smell.

#### Insensitivity of brain to electric fields

It has been suggested that the human brain might be sensitive to electric fields. But to me, to envisage this possibility persuades exactly the opposite, and emphasises how very insensitive the human brain is to either direct or alternating electric fields. Humans by now must have been exposed to a fantastic variety of fields, including a range of frequencies of alternating current that must include the capacity of any imaginable receptor systems. And yet no behavioural changes have been produced. It seems as if the brain were specifically protected from electrical disturbances. Look at the difficulty we have in inducing seizures in giving ECT. Lightning affects the body but not the mind. It looks as though electroreception has been thoroughly bred out of our systems, possibly because those of our ancestors who remained electrosensitive were at some disadvantage, possibly from the electric discharges of some predatorial dinosaur.

Possibly we did this by evolving chemical neurotransmission, which seems otherwise to be an extraordinarily cumbersome addition to a system which is based on purely electrical transmission. But in requiring chemicals for nerve to nerve transmission we made ourselves invulnerable to outside electrostimulation, and myelin did the rest.



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# ARTICLE:

by G Burghardt  
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## Competition and identical twins and a twin-headed snake Excerpt from Email (with permission )

As a father and observer of identical twin daughters and an ethologist carrying out long-term and detailed studies of a two-headed black rat snake (now 19 years old!), my notes might bring a smile if not insight.

First IM, the snake. Both heads are complete and have full sensory and behavioral capabilities (e.g., tongue-flick, capture and ingest prey). From the first

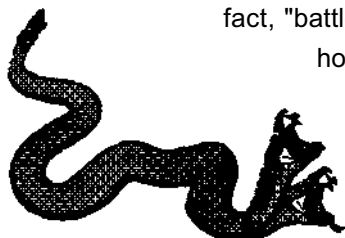
we noted that both heads might attack and attempt to swallow the same mouse. In

fact, "battles" would go on for

hours if we did not intervene, although one

head would usually prevail. We re-

corded in detail five years of



feedings and found no diminution of fighting. We thought we might see some cooperation since the food was going to nourish the same body, in fact going to the same stomach. Over the five years we found some results that suggested that some "cooperation" might nevertheless be taking place. The left head ended up with more total mice, but they were smaller on average than those eaten by the right head. When we compared the total mass of prey eaten by each head over the five years they were virtually identical. When we plugged handling time into the equation the profitabilities were even closer. (Some of these observations were presented in a chapter in a 1991 Cognitive Ethology volume edited by Ristau.)

In trying to interpret this conflict between two measures of cooperation (serious fighting and resource partitioning) I brought in my twin girls. The observations then hold today. While they can be remarkably considerate, helpful, and generous with one another, they can also get into the most vicious altercations

over what seem to their parents minor issues. This morning it was over Karin wearing a necklace given to Liana at Christmas - Liana had given Karin permission at the time to wear it when she wanted to and, of course, as soon as Karin had it on Liana decided that today was the day she wanted to wear it after ignoring it since she received it.

As with IM, I think it reasonable to postulate that cooperation as rational as we might expect has not had a chance to evolve in two-headed snakes nor human identical twins commensurate with their convergent genetic interests. Identical twins also share more interests and preferences than do fraternal twins. Thus this may both intensify the conflict over the same items while at the same time pushing them to solutions and ways of avoiding conflict in their more deliberate moments.

Now a postscript on IM. We always assumed he had a common digestive tract from x-rays taken when he was very young (and small). Recently we carried out a study in which we wanted to see if we fed one head to satiation whether the other head would still eat. This was to be a neat way of separating oropharyngeal and postingestion factors in satiety. In fact it worked, although it took hours to satiate IM, the opposite head would still take an additional mouse or two. But we decided to carry out more detailed radiological experiments using video, mice, and barium, and discovered that IM has two complete digestive systems, at least to the colon. Now all of a sudden the virtually equal prey ingestion by the two heads makes sense in motivational terms. But our neat experimental model set to resolve an enduring problem in hunger research was not quite so neat any more. I could go on about our delightful friendly monster, but will just remind my friends who focus on human beings of some ancient wisdom: "Be ye therefore wise as serpents" (Matt. 10:16).

In order to understand abnormal or pathological emotional behaviour it is necessary first to understand the nature and function of normal emotional behaviour. Despite the long history of studying, experimenting, and theorising in emotion I believe that currently accepted approaches to emotion have failed to grasp its essential nature and function.

These can only be determined from a study of animals in which the interaction of the basic physiological and behavioural systems with complex cognitive processes is at a minimum. It is my view that the ethologi-

cal analysis of social signalling and display behaviour has provided the answer to the origin and nature of emotional behaviour. In particular Desmond Morris

has provided a convenient summary in his analysis of the origin of social signals.<sup>2</sup> Table 1 is a modified and extended version of one given by Morris. It summarises the causation and nature of emotional behaviour and, by implication, its function. Briefly:

**I. Causation of emotional behaviour** is conflict and frustration or thwarting. (The pronunciation of thwarting and frustration can be difficult even to a native English speaker and I sympathise with non-native speakers.) But note it refers to the blocking (an easier word?) of action tendencies once they have been aroused, hence the arousal and motivational element in emotion.

**II. Nature of emotional behaviour** is response to thwarting. The Primary responses are simply attempts to perform the aroused behaviour and so consist of:  
(a) Intention movements of the aroused Consumma-

tory behaviour, (b) Appetitive/Aversive orientation behaviour to the arousing stimulus. This behaviour may become predominant, (c) Visceral responses to support the appetitive and consummatory behaviour. The table shows these as Somatic responses (a and b) and as Visceral responses (c).

**III. Function of emotional behaviour** is to signal the state of thwarting to a social partner. The Primary responses have the necessary information to signal to a social partner that a specific motivation has

been aroused and a specific behaviour is trying to be performed but is blocked. If the block is due to the current behaviour of a social partner then evolutionary selection will

favour responses by the partner that effectively change the situation, remove the block, and facilitate normal performance of the aroused behaviour. This selection will also operate on non-social thwarting by environmental obstacles which social partners can influence. It will also operate between species giving predator-prey "emotional" defence displays.

This is not the place to expand and explain this approach to or theory of the nature of emotion.<sup>3,4,5</sup> Rather I want to explore the implications of what happens when the social partner fails to respond appropriately and the Primary responses to thwarting fail to end thwarting.

**IV. Pathology of emotional behaviour**  
**Primary responses to thwarting.** Persistent or chronic arousal of thwarting states especially through learned associations may give incipient Primary responses in the form of visceral preparations and

*... What I have tried to do here is to use the ethological analysis of conflict states to illuminate the continuity of the causes, nature, and function of emotional behaviour from normal, through abnormal, to pathological conditions...*

muscle tensions that are sub-threshold and do not become converted into overt behaviour. This is probably the case in "Anxiety" states with arousal of general orientation action states and their visceral accompaniments. *Panic disorder and Agoraphobia* may be a consequence of an increasing arousal of incipient action state, especially if there is feedback in arousing stimulation from awareness of the muscle tensions and visceral activations, until there is an acute undirected motor and generalised sympathetic visceral discharge either to a normally sub-threshold stimulus or to no stimulus -- rather like the classic ethological notion of a "Vacuum activity". *Specific phobias* involve comparable processes but the behaviours are released and directed to or from specific learned stimuli which are being persistently re-activated through learned associations and memories.

Table 1

**Thwarting Situations**

- I Absence of indispensable stimuli following intense arousal
- II Simple physical obstruction of aroused activity
- III Simultaneous arousal of two or more incompatible tendencies

**Primary Responses to Thwarting**

<b>Somatic</b>	<b>Autonomic</b>
1 <i>Perseverance</i> - persistent approach and adjustment (I, II)	1 <i>Alimentary</i> - salivation increase or decrease, urination, defecation
2 <i>Snap Decision</i> - capricious choice of response (III)	2 <i>Circulatory</i> - pallor, flushing, genital vasodilation, fainting
3 <i>Threshold Intention Movements</i> - initial element of response (I, II)	3 <i>Respiratory</i> - changes in rate and amplitude, panting, gasps,
4 <i>Ambivalent Posturing</i> - elements of both responses (III)	4 <i>Thermoregulatory</i> - sweating, raised/sleeked hair
5 <i>Alternating Intention Movements</i> - successive responses (III)	5 <i>Lacrimatory</i> - weeping

**Secondary Responses to Thwarting**

1 <i>Displacement Activities</i>	- irrelevant behaviour
2 <i>Redirection Activities</i>	- response to another stimulus
3 <i>Regressive Activities</i>	- immature responses
4 <i>Neurotic Inactivity</i>	- loss of responsiveness
5 <i>Aggressive Behaviour</i>	- intense approach and adjustment
6 <i>Stereotypic Activities</i>	- chronic autonomic imbalances

**Secondary responses to thwarting.** Morris describes a set of Secondary responses to thwarting. These are shown in Table I derived from Morris but to which I have added three categories i.e., Aggres-

sive behaviour, Stereotyped activities, and Visceral dysfunction, to the original list given by Morris.

Most of these concepts will be familiar to ethologists and they can be part of "normal" display behaviour i.e., they can be selected and ritualised in evolution where they cause appropriate responding in the interacting partner. Where selection has not produced an appropriate response system to result in a species display or ritual then these behaviours represent a breakdown of behaviour and in that sense are abnormal and, in extreme form, pathological. It is these secondary responses that are of interest to psychiatry since they are the basis of neurotic behaviours and disorders.

But these behaviours have lost the consummatory intention movements that signal the nature of the aroused but blocked motivated actions and so they have lost their specific signal value. The message is simply that there is a state of chronic thwarting; hence the problem of the psychiatrist in determining the nature of the frustration and conflict underlying these Secondary responses.

In each case, therefore, I should like to consider:

- (i) The *Nature* of these secondary responses i.e., how they can be derived from the Primary responses. Such a derivation is necessary if my explanation of emotion is to be consistent and inclusive. Morris did not provide such an explanation, but simply classified them. Yet they may still have some further signalling or other adaptive value,
- (ii) The *Function* i.e., how they might bring about the ending of thwarting either through their general signalling value or by direct effects on the thwarting situation.
- (iii) The *Pathology* that could result from the failure of these Secondary responses to end thwarting.

Table 2 (see page 17) summarises this analysis.

**1. Aggressive Behaviour**

*Nature.* The simplest effect of failure to remove thwarting is to increase the intensity of the appetitive or aversive orientation behaviour. This includes physical forceful re-orientation of the stimulus object



following appetitive approach or its forcible removal where the aversive stimulus is blocking the flight path in aversive orientation, which can account for Offensive aggression and Defensive aggression respectively.

*Function.* Obviously attack directly and operantly changes the thwarting situation. However these attack responses have been selected and the intention movements then form agonistic aggressive or threat displays. The attack system may have become autochthonous in motivation (i.e., has its own motivational and releasing stimulus system). Thwarting of other motivated action tendencies to occur. Offensive aggression might then be classed as a Primary response and so, according to my theory and definition of emotion, the aggression will appear as unemotional attack that is experienced as "cold" and unemotional or even as pleasurable when restricted in performance. It becomes emotional when its performance is itself thwarted and the intention movements of attack are then the threat signals of "anger" displays. The same applies to learned or "operant" aggression which is "cool" and unemotional until thwarted.

*Pathology.* This type of secondary response may account for violence in sex and rape, for wife and child battering, for pathological frustrative aggression, and for the explosive personality.

## 2. Regressive Activities

*Nature.* These are persistent Primary responses that have become coarser and degraded, losing their finer motor and attentional components and especially learned refinements and orientations. Thus there is a regression to earlier learned and unlearned responses and to simpler action patterns, e.g., from fine digit and limb actions against the whole stimulus, and to gross whole undirected body patterns.

*Function.* Coarser, simpler behaviour may directly remove thwarting - the brute strength approach. Infantile behaviour may elicit parental type caring and social helping responses i.e. it is et-epimeletic.

*Pathology.* Temper tantrums in children and adults

may be just such intense gross undirected infantile appetitive approach orientation behaviour. Panic escape behaviour is the equivalent intense gross undirected aversive orientation flight movements. Chronic social dependency states may also involve regressive behaviour.

Table 2

Primary responses to thwarting  
*Nature:* Anticipatory visceral and sub-threshold somatic responses.  
*Function:* Preparation for thwarting responses  
*Pathology:* Anxiety, Panic disorder, Agoraphobia, Specific phobias

Secondary responses to thwarting  
*Aggressive Behaviour*  
*Nature:* Approach & adjustment or removal of the thwarting stimulus  
*Function:* Direct removal of the source of thwarting  
*Pathology:* Violence in sex, parenting, family & social relations

*Regressive Activities*  
*Nature:* Simpler and developmentally earlier Primary responses  
*Function:* No immediate function; evolution of stylised signals  
*Pathology:* Obsessive-compulsive disorders

*Visceral Dysfunction*  
*Nature:* Enhanced fragmented Primary visceral activity  
*Function:* No immediate function; evolution of signals; avoidance  
*Pathology:* Psychosomatic disorders; Hysteria

*Neurotic Inactivity*  
*Nature:* Fatigues Primary responses  
*Function:* Elicit epimeletic (caring) responses  
*Pathology:* Separation "despair"; Apathy; some forms of Depression

*Redirected Activity*  
*Nature:* Orientation switched to non-thwarting stimulus substitute  
*Function:* Consummation without confrontation and social disturbance  
*Pathology:* Deviant objects, fetishes, fixations in sex, parenting, etc.

*Displacement Activities*  
*Nature:* Release of a third motivational action state in conflicts  
*Function:* Switches motivation of the social partner and self  
*Pathology:* "Binge" behaviours such as bulimia

## 3. Stereotyped Activities

*Nature.* Here the persistent orientation behaviour becomes fragmented and fractional motor components are performed repeatedly in anticipation or fear of failure resulting from experience of frequent failure to end thwarting.

*Function.* These have been used in evolution to form ritualised displays in which the signal movement has a constant form and the strength of the underlying

blocked action motivation is indicated by repetition of the stylised action.<sup>6</sup> Otherwise they seem to be real pathologies with no functional value.

*Pathology.* Minor "nervous automatisms" derived from anticipatory actions are part of normal "behaviour in waiting" but in pathology appear as chronic tics, automatisms, and obsessive behaviours. The stylised character and increased repetition with strength of the thwarted action state would seem to apply to the "rituals" in obsessive-compulsive neuroses in which failure to engage in ritual acts often results in mounting "anxiety and tension". I have already suggested that the latter is what I call the thwarted action state. This action state system captures the cognitive processes of attention, stimulus perception, and thinking activity, giving obsessive cognition as well as the compulsive motor actions.

#### **4. Visceral Dysfunction**

*Nature.* Here it is the persistent supporting visceral responses that become fragmented with one system element predominating i.e., vascular, respiratory sudomotor etc.

*Function.* Enhancement of specific visceral actions makes specific actions more detectable by the social partner and is a feature of ritualised displays.<sup>2</sup> Without the specific actions there seems no signalling function in relation to thwarting but they provide a socially and personally acceptable reason for avoiding the thwarting situation i.e., they serve an avoidance function.

*Pathology.* This is the basis of the psychosomatic disorders of cardia, gastric, duodenal, respiratory and dermal systems; some cases of asthma. Asthma involves muscle spasms and/or mucus secretion and there is evidence of conflict states in some cases e.g., Straker and Tamerin reported conflict between aggression and fear of parental punishment in child cases.<sup>7</sup> When placed under stress they show anxiety rather than hostility seen in normals.<sup>8</sup> Dysfunction of Primary Visceral responses and an equivalent dysfunction of the somatic (both motor and sensory) responses could account for Hysterical symptoms.

#### **5. Neurotic Inactivity**

*Nature.* This is Morris' own term. It can be understood as fatigue from persistent attempted Primary responses leading to their cessation. There is also a general loss of responsiveness to stimulation because the frustrated motivation is still strongly active and predominates over other motivations probably by precluding them from the attentional systems.

*Function.* May serve to prevent physical exhaustion but does not resolve the thwarting, c.f. Kaufman & Rosenblum for the "despair" phase of separation behaviour in monkeys.<sup>9</sup> It may elicit and make possible parental caring by strangers, e.g., a lost infant monkey picked up by a stranger will distress call and cause attack by the mother, by a centre male, or by group mobbing; but a silent "despairing" infant may be cared for by anyone, even a male or a human in safety (personal observation). The flaccid inactivity that may follow fear, immobility or freezing behaviour could serve as a false signal as in "death feigning" as well as allowing prolonged immobility without muscular exhaustion. These are all signalling effects.

*Pathology.* Flaccidity and sleep may occur especially as a consequence of parasympathetic rebound in chronic stress; reported in immobility reactions in birds and in battle stress in men. Apathy is seen in persistent separation and loss, in learned helplessness, and can become pathological in inability to study in students and in the unemployed. Some cases of reactive depression may represent neurotic inactivity.

#### **6. Redirected Activity**

*Nature.* Here the orientation of the consummatory act is captured by an alternative available stimulus or stimulus substitute.

*Function.* Avoids the behavioural and visceral breakdown effects of persistent thwarting. It also allows social partners to resume their own activities and so avoids social disruption.

*Pathology.* It could account for deviant sexual objects including some homosexuality and fetishism, paren-

tal fixations on animal pets and objects, infant attachment to pets or toys, all of which can become pathological when intensive and exclusive.

### 7. Displacement Activities

*Nature.* Where motivational action states are in conflict another motivation may secure the stimulus input to the attentional system. This is the classic ethological concept of an irrelevant or displacement activity. Activities such as eating, drinking, and skin care are common in nervous waiting states. Selection may convert such responses into ritualised displays.

*Function.* May serve to switch the motivation of the social partner, and of the self, in the thwarting situation, e.g., displacement feeding in agonistic encounters substitutes a stimulus to social feeding for the threat stimulus; sexual presenting in subordination encounters in monkeys elicits sexual tendency to conflict with the dominant's attack motivation; human females may use sexual actions to assuage the male's anger and avert attack.

*Pathology.* Displacement activities may underlie nail-biting and skin-picking, eating disorders of bulimia and obesity, more benign "binge" behaviours of shopping and buying, and may precipitate drinking with addiction to alcohol, and smoking with addiction to nicotine. This behaviour does not satisfy the original motivation which remains aroused and thwarted. Hence the tendency to repeat the displacement behaviour which becomes conditioned to the relaxation/relief comfort or pleasure that it produces. However, this behaviour will itself be subject to satiation unless it belongs to a motivation that does not satiate, such as grooming, shopping (foraging) etc., or satiation is prevented as in the vomiting in bulimia. Displacement activities are the equivalent of Freudian "sublimation".

[Interestingly bulimia is often associated with anorexia and anorexics have been characterised as i) introverted, anxious, dependent, and obsessional, ii) feel ineffectual and unable to control their weight, and iii) use their behaviour to control other people's behaviour, i.e., social manipulation by the signalling

of thwarting.]

Of course, there may be combinations of these Secondary responses to thwarting, e.g., a) thumb-sucking could be seen as both displacement feeding and, after infancy, as a regressive activity, b) obsessive-compulsive washing rituals could be both stereotyped and displacement skin-care activity, and c) self-injury syndromes may be aggression redirected to the self.

It only remains to draw your attention to the masterly paper by G. P. Baerends entitled "A tentative model of the causation of neuroses".<sup>10</sup> Baerends presents a detailed systems model based on the ethology of conflict states in birds. Nothing I have said is inconsistent with his model. What I have tried to do here is to use the ethological analysis of conflict states to illuminate the continuity of the causes, nature, and function of emotional behaviour from normal, through abnormal, to pathological conditions.

### Appendix

It is perhaps of interest to note that Cognitive approaches to the treatment of Stress may be consistent with the analysis presented here. For example Taylor has proposed three kinds of cognitive adjustment processes in his Cognitive adaptation theory of coping with stress.<sup>11</sup> Each process can be understood in terms of the thwarting theory of emotional behaviour, as follows:

1. *Search for meaning.* This is equivalent to understanding the motivations or action states involved or thwarted so that learned control or canalisation of the motivations can be attempted.
2. *Gain mastery of the events.* This is equivalent to the acquisition of learned coping behaviour to end thwarting or resolve the conflict.
3. *Enhance self-esteem.* This is equivalent to developing a status relative to others that is not consistent with emotional signalling for their help.

*References: page 22*

# ABSTRACTS & EXTRACTS...

Sullivan PF, Joyce PR, Bulik CM, Mulder RT & Oakley-Browne M; Total cholesterol and suicidality in depression.

Freedman DS, Byers T, Barrett DH, Stroup NE, Eaker E & Monroe-Blum H: Plasma lipid levels and psychology characteristics in men,

Pawson T: Protein molecules and signalling networks,

**Sullivan PF, Joyce PR, Bulik CM, Mulder RT & Oakley-Browne M: Total cholesterol and suicidality in depression. Biol Psychiatry 1994;36:472-477.**

There exists considerable controversy regarding an association between low total cholesterol and increased mortality from suicide. As suicide mortality is a crude marker for suicidal ideation and behavior, we investigated the association between total cholesterol and suicidality in a depressed sample. Ninety men and women meeting structured criteria for a major depressive episode of at least moderate severity participated in a study of predictors of treatment response. A three level variable codified the degree of suicidality in the previous month: no suicidal thoughts (39/90), suicidal ideation or plan (38/90), and a suicide attempt (13/90). There was a significant univariate association between lower cholesterol levels and increasing degrees of suicidality. In a multivariate analysis, this association was the only one that neared statistical significance ( $p=0.068$ ). Although it is premature to conclude that these variables are causally associated, data from a number of sources suggest that this association is worthy of further study.

**Freedman DS, Byers T, Barrett DH, Stroup NE, Eaker E & Monroe-Blum H: Plasma lipid levels and psychological characteristics in men. American Journal of Epidemiology 1995;141:507-517.**

Results of several studies suggest that either a reduction in the serum level of total cholesterol level or a persistently low cholesterol level may be associated with an increase in violent deaths. Although there are several possible explanations for these observations, it has been suggested that the cholesterol level could influence various behaviors. We therefore examined the cross-sectional relation of several psychological characteristics, assessed by the Diagnostic Interview Schedule and the Minnesota Multiphasic Personality Inventory, to levels of total cholesterol, high-density lipoprotein cholesterol, and triglycerides among 3,490 men aged 31-45 years who were examined in 1985-1986. (All men had served in the US Army between 1965 and 1971.) Compared with that of other men, the mean total cholesterol level was 5 mg/dl higher among 697 men diagnosed with generalized anxiety disorder (possibly because of increased catecholamine levels) and 7 mg/dl lower among 325 men with antisocial personality disorder ( $p<0.01$  for each association). These differences could not be attributed to education, relative weight, cigarette smoking, use of various medications, or other potential confounders. In contrast, cholesterol levels were not significantly associated with major depression or hostility; levels of high-density lipoprotein cholesterol and triglycerides were not related to any diagnosis. If the serum level of total cholesterol is found to be predictive of antisocial personality disorder in longitudinal analyses, this association may have implications for cholesterol-lowering recommendations.

**Pawson T: Protein molecules and signalling networks. Nature 1995;373:573-580.**

Abstract: Communication between cells assumes

particular importance in multicellular organisms. The growth, migration and differentiation of cells in the embryo, and their organization into specific tissues, depend on signals transmitted from one cell to another. In the adult, cell signalling orchestrates normal cellular behaviour and responses to wounding and infection. The consequences of breakdowns in this signalling underlie cancer, diabetes and disorders of the immune and cardiovascular systems. Conserved protein domains that act as key regulatory participants in many of these different signalling pathways are highlighted.

**Extracts:** Cellular interactions can be viewed as proceeding in two steps. Initially, an extracellular molecule binds to a specific receptor on a target cell, converting the dormant receptor to an active state. Subsequently, the receptor stimulates intracellular biochemical pathways leading to a cell response, which may involve progression through the cell cycle and changes in cellular gene expression, cytoskeletal architecture, protein trafficking, adhesion, migration and metabolism. How are these internal pathways controlled and organized? Recently, a convergence of genetic, biochemical and structural data has focused attention on conserved protein modules that regulate signal transduction through their ability to mediate protein-protein interactions. These conserved molecules represent common regulatory features of many distinct signalling pathways which are used to build up complex networks of interacting

proteins.

### **SH2, SH3, and PH domains as building blocks.**

Many polypeptide hormones, as well as cytokines, antigens and components of the extracellular matrix, bind membrane-spanning receptors that signal through associated cytoplasmic protein kinase (PTK) domains. Although the targets of these PTKs may have quite different biochemical activities and biological functions, they often contain related sequences of 50-100 amino acids in length. These sequences, referred to as Src-homology-2 (SH2), Src-homology-3 (SH3) and pleckstrin homology (PH) domains, can each fold into a compact and functional module independently of surrounding sequences. ...

Proteins with SH2 domains control biochemical pathways involving phospholipid metabolism, tyrosine phosphorylation and dephosphorylation, activation of Ras-like GTPases, gene expression, protein trafficking, and cytoskeletal architecture....

Several lines of circumstantial evidence suggest that PH domains may tether signalling proteins to membranes. ...

SH2, SH3 and PH domains all appear to control the location of signalling proteins within the cell. This is a particularly striking feature of SH3 domains, which are closely tied to the control of cell morphology.

## **AS CITED BY**

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### **Price J: Alternative depression strategies in tree shrews and rats (ASCAP, May 1995)**

- <sup>1</sup> Ferguson RT: The Anglo-Saxon approach to depression. *Acta Psychiatrica Scandinavica* 1961 ;Suppl 162:201-209.
- <sup>2</sup> Price JS: Hypothesis: The dominance hierarchy and the evolution of mental illness. *Lancet* 1967,2:243-246.
- <sup>3</sup> Price JS: The genetics of depressive behaviour. In A Coppen & A Walk (Eds.) *Recent Developments in Affective Disorders*. London: Royal Medico-Psychological Association, 1968.
- <sup>4</sup> Holst DV: Vegetative and somatic components of tree shrews' behavior. *J of the Autonomic Nervous System* 1986;Suppl:657-670.
- <sup>5</sup> Blanchard DC, Sakai RR, McEwen B, Weiss SM & Blanchard RJ: Subordination stress: Behavioral, brain and neuroendocrine correlates. *Behavioral Brain Research* 1993;58:113-121.
- <sup>6</sup> Dixon AK, Fisch HU, Huber C & Walsler A: Ethological studies in animals and man: Their use in psychiatry. *Pharmacopsychiatry* 1989;Suppl(2):44-50.
- <sup>7</sup> Gold PW, Goodwin FK & Chrousos GP: Clinical and biochemical manifestations of depression: Relation to the neurobiology of stress. *New England J or Medicine* 1988;319:348-353.
- <sup>8</sup> Lange J: The endogenous and reactive affective disorders and the manic-depressive constitution. In O Bumke (Ed.) *Handbook of Mental Diseases*, volume 6. Berlin: Springer, 1928.
- <sup>9</sup> Pollitt JD: Depression and the functional shift. *Comp Psych* 1960;1:381-390.
- <sup>10</sup> Frank RL: The organised adaptive aspect of depression-elation response. In PH Hock & J Rubin (Eds.) *Depression*. New York: Grune & Stratton, 1954.

# AS CITED BY...

## Cover page

- <sup>1</sup> Christie A: The A.B.C. Murders. New York, NY: Bantam Books, 1936, 1967, p. 103.

## Birtchnell: Response ... p 4

- <sup>1</sup> Birtchnell J: Does recollection of exposure to poor maternal care in childhood affect later ability to relate? Brit J of Psychiatry 1993;162:335-344.
- <sup>2</sup> Birtchnell J: How Humans Relate: A New Interpersonal Theory. Westport CT: Praeger, 1993.

## Mealey: Internal Working Models ... p 5

- <sup>1</sup> Dunn J: Siblings and development. Current Directions in Psychological Science 1992;1:6-9.

## Birtchnell: Sundry Matters ... p 6

- <sup>1</sup> Birtchnell J, Falkowski J & Steffert B: The negative relating of depressed patients: A new approach. Journal of Affective Disorders 1992;24:165-176.
- <sup>2</sup> Emde RN, Plomin R, Robinson J, Corley R, DeFries J, Fulker DW, Reznick JS, Campos J, Kagan J & Zahn-Waxler C: Temperament, emotion and cognition at fourteen months: the MacArthur longitudinal twin study. Child Development 1992;63:1437-1455.
- <sup>3</sup> Kraemer GW: A psychobiological theory of attachment. Behavioral and Brain Sciences 1992; 15:493-541.
- <sup>4</sup> Mealey L: The sociobiology of sociopathy: An integrated evolutionary model. Behavioral and Brain Sciences. In press.
- <sup>5</sup> Rowe DC: A biometrical analysis of perceptions of family environment: A study of twin and singleton sibling kinships. Child Development 1983;54:416-423.
- <sup>6</sup> Rowe DC: As the twig is bent: The myth of child-rearing influences on personality development. J of Counseling and Development 1990b;68:606-611.

## Price: Electric fish ... p 10

- <sup>1</sup> Price J: Alternative strategies in electric fish. The ASCAP Newsletter 1994;7(5):8-11.
- <sup>2</sup> Hopkins CD: Neuroethology of electric communication. Ann Rev Neurosci 1988;11:497-535.
- <sup>3</sup> Bullock TH: Significance of findings on electroreception for general neurobiology. In TH Bullock & W Heiligenberg (Eds.) Electroreception New York: Wiley, 1986, pp 651-674.
- <sup>4</sup> Tinbergen N: The Herring Gull's World. London: Collins, 1953.
- <sup>5</sup> Price J: Homeostasis or change? A systems theory approach to depression. Brit J of Med Psych 1991 ;64:331 -344.
- <sup>6</sup> Birtchnell J: How Humans Relate: A New Interpersonal Theory. Westport, CT: Praeger, 1993.

## Salzen: Ethology... p 15

- <sup>1</sup> Paper presented at the 11th International Congress of Human Ethology, Amsterdam, July 26-31, 1992.
- <sup>2</sup> Morris D: The feather postures of birds and the problem of the origin of social signals. Behaviour 1956;9:75-113.
- <sup>3</sup> Salzen EA: Social attachment and a sense of security: A review. Social Science Information 1978; 17:555-627.
- <sup>4</sup> Salzen EA: Perception of emotion in faces. In G Davies, H Ellis & J Shepherd (eds) Perceiving and Remembering Faces. London: Academic Press, 1981, pp 133-169.
- <sup>5</sup> Salzen EA: The construction of emotion from facial action. In A W Young & H D Ellis (eds) Handbook of Research on Face Processing. Amsterdam: North-Holland, 1989, pp 177-186.
- <sup>6</sup> Morris D: 'Typical intensity' and its relation to the problem of ritualization. Behaviour 1957;11:1-12.
- <sup>7</sup> Straker N & Tamerin J: Aggression and children asthma: A study in a natural setting. J Psychosomatic Res 1974;18:131-135.
- <sup>8</sup> Mather AA & Knapp PH: Emotional and adrenal reactors to stress in bronchial asthma. Psychosomatic Medicine 1971 ;33:323-327.
- <sup>9</sup> Kaufman IC & Rosenblum LA: The reaction to separation in infant monkeys: Anaclitic depression and conservation-withdrawal. Psychosomatic Medicine 1967;29:648-675.
- <sup>10</sup> Baerends GP: A tentative model for the causation of neuroses. In H M van Praag (ed) Research in Neurosis. Utrecht: Bohn, Scheltema & Holkema, 1976, pp 183-191.
- <sup>11</sup> Taylor SE: Adjustments to threatening events: A theory of cognitive adaptation. Amer Psychologist 1983;38:1161-1173.