For evolutionary psychiatrists, psychologists and others interested in sociophysiological Integration

ASCAP

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"As is often the case, pathology revealed an unrecognized normal mechanism by distorting it. Tay-Sachs disease gave me the first inkling that gangliosides could build neurites, because the massive accumulation of [theTay-Sachs ganglioside] in Tay-Sachs brain neurons seemed to correlate with an outgrowth of giant abnormal neurites."

Abraham Rosenberg[1]

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ASCAP Society Mission Statement:

The ASCAP 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 cellular processes to individuals in groups.

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.

The ASCAP Newsletter is a function of the ASCAP Society.

Editor-in-Chief: Russell Gardner, Jr. Dept. of Psychiatry & Behavorial Sciences Room 4.450, Marvin Graves Building, D-28 University of Texas Medical Branch Galveston TX 77555-0428 Tel: (409) 772-7029 Fax: (409)772-6771 E-Mail: rgardner@utmb.edu

European Editor: John S. Price
Odintune Place
Plumpton East
Sussex BN7 3AN
ENGLAND (01144)27-389-0362 Fax: (011 44)27-389-0850 E-Mail: 100042.2766@compuserve.com

Managing Editor: Frank Carrel
Dept. of Psychiatry & Behavorial Sciences
Room 1.103, Marvin Graves Building, D-28
University of Texas Medical Branch
Galveston TX 77555-0428
Tel: (409) 772-3475
Fax: (409) 772-4288
E-Mail: ascap@utmb.edu

Previous volumes are available. For details, contact Frank Carrel, the Managing Editor of *The ASCAP Newsletter,* at the address above.

The WWW Address for the The ASCAP Home Page is:

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ADDRESSED TO & FROM ...

Program Plans for the Annual Meeting

The program for our ASCAP meeting in Tucson this June 4, is shaping up nicely. As many of you know, the program theme will be *"Evolutionary Psychotherapy",* and each presentation will bear in some way on the topic. Aside from the Glantz and Pearce approach, a true evolutionary psychotherapy may not exist at this point. Most of us embraced pre-existing therapy systems prior to our evolutionary involvements, and thus our evolutionary psychotherapy is more a evolution- or Darwin-enhanced method than anything else.

Thus, I anticipate that most of the papers will briefly describe the preferred pre-existing model, and then elucidate various linkages and interrelationships with evolutionary formulations. Following Leon Sloman's suggestion, I am also asking presenters to converge their talks on an illustrative case study that will feature evolutionary explanations and interventions. Talks will run 20 minutes or so, leaving around 10 minutes for discussion. I anticipate that the discussions and interchange will be lively and creative. In the course of their talks, presenters may also address definitional issues (e.g., what exactly is evolutionary psychotherapy), and the question of what the future holds for this new field.

Presenters will include myself, Ferdo Knobloch, Randy Nesse, Leon Sloman, Andy Thomson, Brant Wenegrat, Helen Wood, Dan Wilson, Lynn O'Connor, and Cornelius Bakker. Discussant will be Russell Gardner, Jr. Andy Thomson, a new member of ASCAP, is a psychiatrist at the University of Virginia. He wears many hats in the Charlottesville area, but his paper will focus on evolutionary psychotherapy and forensic psychiatry (viz., sexual offenders). Helen Wood is a student and colleague of mine, and she will address the evolutionary aspects of psychological kinship therapy. Lynn O'Connor from San Francisco, has been associated with the Weiss research group, with Marianne Bakker-Rabdau, Cornelius Bakker has written on territoriality and the two of them have developed a territoriality skills course. I hope that our conference will give a definitive boost to the emerging field of evolutionary psychotherapy.

Between now and June 4,I invite ASCAP members to offer any suggestions and ideas regarding this upcoming meeting, either to me directly or to the Newsletter. I am particularly interested in your ideas regarding defining evolutionary psychotherapy and its likely future. Thanks in advance.

Kent Bailey
kbailey@saturn.vcu.edu

Aaron T. Beck ASCAP Award Competition

A number of entries have arrived before the deadline. The committee chaired by me otherwise includes Daniel Wilson and Leon Sloman. We are examining and evaluating the contributions even as this goes to press. We hope to notify the winner as soon as possible in order that they can make their meeting arrangements.

Thomas Joiner
thomasjoiner@utmb.edu

Annual Meeting Information

by Russell Gardner, Jr.

Our hotel has changed to the Plaza Hotel in Tucson, reservation number 1-(800) 843-8052 **(see form for information).** You might make your plans as early as possible. We are reserving a meeting room for about 50 people and ask those who are not presenters to register with us. A registration fee of $20.00 will help defray meeting room costs. Pre-registration will help us plan more appropriately so we will appreciate your sending in the **form** that accompanies this issue although registration on site will be possible also.

The specific speaker schedule as so far drafted (see President Bailey's program notes on this page) is as follows:

8:00 a.m. Kent Bailey: Welcome & keynote address
Dan Wilson Ferdo
8:45 a.m. Knobloch Break
9:15 a.m. Andy Thomson Brant
9:45 a.m. Wen eg rat Helen Wood
10:30 a.m. Lunch
11:00 a.m. Presentation by Beck
11:30 a.m. Award winner
12 noon Lynn O'Connor
1:45 pm Cornelius Bakker
2:15 p.m. Break
2:30 p.m. Randy Nesse Leon
3:15 p.m. Sloman Russell
3:45 p.m. Gardner, Jr. Business
4:15 p.m. Meeting
4:45 p.m.

This schedule is subject to change.

Social Story Deficit

Directed to Dr. Ferdo Knobloch:

Thanks for including a summary of your work on group-schemas. I just wanted to add the observation from my clinical work in an inpatient facility for children & adolescents.

I used to conduct group therapy for "feral" boys (ages 9 to 13) who showed almost no sensitivity to group norms of behaviour and self-control. These little guys had used physical and sexual aggression, and stealing behaviours to satisfy their 'primal' needs in virtually total disregard for others. I was supposed to socialize them!

We had a therapeutic community with a reward system which worked well with other patients, but not these boys.

I put them in groups of four, & I had one of the larger male unit staff sit in on each group session (1/2 hour was as long as they could concentrate or self control even with authority & muscle close by). The first thing I initiated was a system of bags of candy for each boy; each started with four pieces which he could keep if he followed the rule of the group, but he had to hand over one piece to the victim of any aggression or rule-breaking.

Next I asked them to imagine a simple social scenario and then to draw the next step (the consequence of the social interaction).

Very few of these boys could do this task; the conclusion we drew was that these boys with 'feral' behaviour were not making pictures in their heads of social encounters, so they could not control themselves on the basis of imagined consequences! We had to teach them to make mental pictures before they acted on a stimulus.

These boys were all from extremely impoverished environments in which neglect, abuse, and parental mental illness were extreme. Those boys had survived with virtually no conventional socialization. They had enough 'brain power" to extract the resourses they needed for biological life but they weren't able to survive in the urban social environment of public school, and legal responsibility when they got to an age where most individuals are expected to show some control and judgement, & to respect the rights of others.

M.M.D. Monnot
mmdm2@hermes.cam.ac.uk

Sociophysiological Therapy

I agree that being a sociophysiological therapist explains what R.G. did with the Davis family in his report in the January *ASCAP,* Terminology for What we do..., pages 6-10. As Devil's advocate I ask: If some physical pathological states are caused by mental or emotional problems, don't we need "psyche" to explain them, as in psychosomatic? Or could one say sociosomatic illness? That sounds good.

As for the Davises, I'm impressed. Like the son, Johnny, I'd have thrown up my hands and said you're all better off without each other...no charge! As a therapist, how do you distinguish love and dependency? Is it good for dependent people to stay together?

I worry about the daughter and her kids...they're the ones that seem to be penalized for the mutual dependency of the parents and their growing dependency on their daughter and her husband.

I'm becoming more and more enamored with the concept of allies. My wife, Yvonne, and I have often discussed the feeling of safety we have when we're together and laughed over the futility of that feeling if we were actually attacked by someone or a bear. That's one of the benefits of being allies. However, it's even funnier and more futile that I'd probably protect her to the death, being a male and a lover, so that she could get away ... but, being a lover, she probably wouldn't run. Alliance may sometimes be an adverse condition.

What's much more important than having an ally against a bear, is having an ally against the human condition. We have an old friend, a scientist, who had a heart attack, much to his surprise, having never paid the slightest attention to his body or emotions (a condition I have noticed in other scientists) and a triple by-pass, followed by complications. He's unhappy to say the least.

He and his wife are Brits, with the stiff upper lip and no mutuality: he's always takes care of everything at home, but doesn't run anything. The result is he has no ally against what's happening to him ... except Yvonne, who, typically, laughs at him gently, and asks him "What did you expect?" He appreciates such treatment.

Glenn Cochran
pithycus@worldnet.att.net

Twins - Note on Probability (From E-Mail)

DZ twinning has been associated with a number of factors, unlike MZ twinning which does not have a genetic basis so far as we know. There have been some reports of familial MZ twinning, associations between left-handedness and MZ twinning in families, but it seems that MZ twinning occurs randomly in virtually any family, and shows a fairly constant rate across ethnic groups (1/240 births).

It is, therefore, important to distinguish twin type when discussing probability.

Factors influencing increased DZ twinning include increased maternal age, increased parity (even among younger women), increased coital frequency, intercourse after periods of abstinence (such as after periods of war), increased maternal height and weight (this, presumably, reflects some hormonal factor; it is not height and weight per se), genetics (more DZ twins in your family, the higher are your chances), ethnicity (highest in Blacks, especially the Yoruba tribe in Nigeria, lowest in Asians, intermediate in Caucasians), social class (more in lower social class, but this is probably the parity effect).

Some factors, like seasonal variation, have been explored, but nothing really definitive has emerged.

Recent reports claim that twins are on the rise - again it is problematic since twin type tends to be ignored except in the journals. A recent report from Minneapolis showed that MZ twinning was up slightly and DZ twinning down, possibly associated with environmental pesticides that would lower sperm count, women delaying child bearing years (this wipes out parity effect), increased exercise and dieting among females which reduces fertility anyway. However, these data were not the most recent births in that state (even though the paper was recent) and it could be that fertility drugs are having some effect.

There is such a thing as polar body twinning. We do not know how often it occurs. It has happened when the ovum and a polar body are fertilized by two separate sperm, leading to twins who may share varying degrees of relatedness, depending on cross-over between chromatids and other cellular events - see Bulmer (1970), *The Biology of Twinning in Man* - for a discussion of this.

Nancy Segal
nsegal@ccvax.fullerton.edu

Female Choice? (From E-Mail)

Thoughtful woman here with a detailed anecdote:

A little over a year ago, a good friend of mine (then 30) decided she was tired of dating noncommittal men and needed to get serious about finding and securing a relationship that would lead to marriage and kids. However, she had no idea how to go about meeting this goal. Though I've never lacked advice to give to friends already in relationships, I was clueless as to how to approach her current dilemma, especially with the "lead to marriage" caveat.

Soon after, I ran across a book called *Guerrilla Dating Tactics,* directed toward men as well as women, which focused on meeting people and getting to, through, and beyond the first date. It even carried a money back guarantee! So I gave it my friend. She read it, loved it, committed its tips to memory.

The next addition to her arsenal was nothing less than selected passages from *The Moral Animal,* which gave her important information about the animal she was hunting and how to use the tools she had at hand.

She used guerrilla dating tactics and sociobiological insights to meet a variety of men, have 1 st dates with several of them, 2nd dates with a few of them, 3rd, 4th, and 5th dates with two of them, and finally (about 8 months ago) narrowed her interest to one. Now the difficult part: fulfilling the requirements of the caveat. As luck would have it, talk of *The Rules* was all over the media.

I and a couple of other friends have coached her through the intervening months. For a few weeks, any time she was tempted to call him, she called one of us instead. She never neglected to return his calls, which would have been simply rude, but she returned them from work so there was always a reason to keep the conversation short (even though she didn't want to). She only initiated calls if there was something concrete to discuss, such as finalizing plans for a date.

She didn't invite him (though she would have liked to) to accompany her to parties on Friday nights if they had plans for Saturday. Though she was tempted, she never skipped a session at the gym to accommodate his schedule. Though she wanted to, she didn't have sex with him for what seemed to both of them to be an interminably longtime. She avoided saying, "I love you," until he had said it first. The last big hurdle was forcing herself to refuse to move in with him.

When she called me two weeks ago, it was to tell me they're engaged - actually a little ahead of schedule! So far, so good.

For the demographic record: they're both Caucasian, American, from comfortably middle class families (but certainly not Kennedys), she has two degrees more than he and makes more money.

Off the record: this team effort has been pretty excruciating for all of us involved, but with apparently worthwhile results. If these feigning reluctance behaviors are really "second nature" to women, then coming of age in the 80's did a good job of socializing them out of us.

Unfortunately, my friend truly blames the feminist establishment for leading her to believe that she could have a meaningful romantic relationship with a man without having to play games to get there. But, are these really games, or is it the same as training American corporate workers in foreign cultural traditions so they can successfully negotiate deals in other countries - sensitivity training of a sort?

Meanwhile, if NSF would be interested in funding a study to ascertain the success rates of various dating manuals, I'll be happy to write a proposal. Or, if someone else wants to head up such a study, give me a call when you're recruiting subjects for the control group!

Kris Weller
kweller@unm.edu

ARTICLE:

by Howard Bloom

A History of the Global Brain -Creative Nets in the Pre-Cambrian Age

For roughly 10 years, authors and scientists have been churning out books on the subject of a coming global brain strung together by computer networks. The Internet, the Worldwide Web and its successors already allow a neuroscientist in Strassburg to swap ideas instantly with a philosopher of history in Siberia and an algorithm juggler in Silicon Valley. But that, the visionaries of worldwide meta-intelligence say, is just the beginning of a looming human transformation.

My 16 years of interdisciplinary work seem to demonstrate something very different. Yes, the computerized linking of individual minds is likely to bring considerable change. But a worldwide neocortex is not a gift of the silicon age. It is a phase in the ongoing evolution of a networked intelligence which has existed for a very long time. And it is neither uniquely human nor a product of technology. Nature has been far more clever at connectionism than we have. Her mechanisms for information swapping, distributed data processing, and collective creation are more intricate and agile than anything the finest computer theoreticians have yet devised.

The first shock to the theorists of electronically-networked intelligence might well be the biotic counterpart's age. Gravity pulled this earth together 4.7 billion years ago. A mere 500,000 years after the new sphere's crust had stabilized, the powers of chemical attraction yanked together the first detectable life. And a geological wink afterthat-in roughly 3.5 billion b.c.-the first communal "brains" were already making indelible marks upon the face of the waters. Those marks are called stromatolites-mineral deposits ranging from a mere centimeter across to the size of a man, and even to the vastness of a reef. Stromatolites were manufactured by cooperating protist colonies with more microorganisms per megalopolis than the human population of Mexico City. These prokaryotic communities throve in the shallows of tropical lakes and of the ocean's intertidal pools.

The rocky deposits ancient stromatolites have left behind were created by legions of cyanobacteria, organisms so internally crude that they had not yet gathered their DNA into a nucleus. But in their first eons of existence, these primitive cells had already mastered one of the primary tricks of society: the division of labor. Some colony members specialized in photosynthesis, storing the energy of sunlight in the ornately complex molecules of ATP. The sun-powered assemblers took in nutrients from their surroundings and deposited the unusable residue in potentially poisonous wastes. Their vastly different bacterial sisters, on the other hand, feasted on the toxic garbage which could have killed their photosynthetic siblings.

The mass of these interdependent beings were held together by an overarching shelter of their own construction. A mini-lasagna of interlayered cyanobacteria would begin a circular settlement. The waters within which the homestead was established would wash a layer of clay and soil over the nascent encampment. Some of the bacteria would send out filaments to bind these carbonate sediments in place. Tier by tier, the colony would create its infrastructure, an undulose or dome-like edifice which could easily become as large compared to the workers who had crafted it as Australia would be to a solitary child with pail and sand shovel.

Many stromatolites carry a peculiar clue whose meaning has gone overlooked. Their fossilized

remains spread from a common center in ripples...a pattern extremely familiar to the handful of scientists studying a previously unsuspected bacterial property-social intelligence.

THE NETWORKED BACTERIAL "BRAIN"

Eshel Ben Jacob, at the University of Tel Aviv, and James Shapiro at the University of Chicago have been studying bacterial colonies from a radically original perspective-and have emerged with surprising results. Their findings explain why the ripple effect is a mark of bacterial networking-and of much, much more.

For generations bacteria have been thought of as lone cells, each making its own way in the world. Ben Jacob and Shapiro, on the other hand, have demonstrated that few, if any, bacteria are hermits. They are extremely social beasts. And undeveloped as their cellular structure might be, their social structure is a wonder. The ripple effect is one manifestation of a colony's coordinated tactics for mastering its environment. We could call it the probe and feast approach.

A bacterial spore lands on an area rich in food. Using the nutrients into which it has fallen, it reproduces at a dizzying rate. But eventually the initial food patch which gave it its start runs out. Stricken by famine, the individual bacteria, which by now may number in the millions, do not, like the citizens of Athens during the plague of 430 b.c, die off where they lie. Instead these prokaryotes embark on a joint effort aimed at keeping the colony alive.

The initial progeny of the first spore were sedentary. Being rooted to one spot made sense when that microbit of territory was overflowing with edibles. Now the immobile form these first bacteria assumed is no longer a wise idea. Numerous cells switch gears. Rather than reproducing couch potatoes like themselves, they marshall their remaining resources to produce daughters of an entirely different kind - rambunctious rovers built for movement. Unlike their parents, members of the new generation sport an array of external whips with which they can snake their way across a hard surface or twirl through water. This cohort departs en masse to seek its fortune, expanding ring-like from the base established by its ancestors. The travels of the fortunate lead to yet more food.

Successful foragers undergo another mass shift. They give birth to daughters as determined to stick to one spot as their grandparents had once been. These stay-at-homes sup on the banquet provided by their new surroundings. Eventually their perch, too, is sucked dry. They then follow bacterial tradition, generating a new swarm of outbound pioneers. Each succession of emigrants leaves behind a circle thinned by its spreading search. And each generation of settlers accumulates in a thick band as it sucks nourishment from its locale. The ripples of ancient stromatolites are proof positive that life three and a half billion years ago already took advantage of social cooperation.

The work of Ben Jacob and Shapiro has demonstrated that bacterial communities are elaborately interwoven by communication links. Their signalling devices are many: chemical outpourings with which one group transmits its findings to all in its vicinity; fragments of genetic material, each of which spreads a different story from one end of the population to another. And a variety of other devices for long-distance data transmission.

These turn a colony into a collective processor for sensing danger, for feeling out the environment, and for undergoing-if necessary-radical adaptations to survive and prosper, no matter how tough the challenge. The resulting modular learning machine is so ingenious that Eshel Ben Jacob has called it a "creative net."

Take, for example, a process which may have led to the fossilized stromatolites that snake like epileptically misshapen sausages over a distance of two meters or more. All bacterial colonies do

not use the round ripple strategy to explore and exploit. Some, like aquatic myxobacteria-gang-hunters which pursue prey ranging from fellow microorganisms to fish—will stretch and twist until they catch the chemical scent of a victim. But to understand the internal workings of one of these writhing cooperatives, it is wise to peer over Eshel Ben Jacob's shoulder as he carries on his seven-year study of bacillus and discovers how individual bacteria are "pre-wired" to be components of a larger information processing machine.

When famine strikes, some bands of bacterial outriders blaze a long trail which leads to territory as barren as that from which they have fled. But they do not suffer their fate in silence. For they are the sensory tentacles with which the larger group feels out its landscape. As such, they must communicate their findings. To do so, they broadcast a chemical message-"avoid me." Other exploring groups heed the warning and shun their sisters stranded in the desert. By releasing chemotactic repulsers, the failed scouts have sealed their fate. They will die in the Sahara into which they've wandered-unaided and alone. But their suicide has served the collective information-gathering process-adding survey reports to an expanding knowledge-base about the surrounding terrain.

Other bacterial cells encounterturbulent conditions which destroy them before they can transmit their chemical evaluations. But they, too, manage to ship back information about their findings. For the fragments of their shredded genomes filter through the colony, carrying a message of danger. Then there are the voyagers whose trek takes them to a new promised land. These send out a chemical bulletin of an entirely different kind. Loosely translated, it means, "Eureka, we've found it. Join us as quickly as you can."

In all this, the bacterial colony is displaying the classical characteristics of a complex adaptive system-a collaborative learning device. As John Holland, an early pioneer of complex adaptive systems studies, puts it, the "behavior of a diverse array of agents" when merged results in "aggregate capabilities" far beyond those of any individual. These are the powers of a massively parallel distributed system-another example of which is the modern supercomputer.

But Ben Jacob's studies suggest that the bacterial colonies of 3.5 billion years ago had taken giant strides beyond any computer man has yet built. Forthe informationally-linked microorganisms under Ben Jacob's microscope demonstrate a skill exceeding the capacities of any device from Cray Research or Fujitsu. Working as a group, bacteria possess a transformative knack long thought impossible. Not a random process like mutation, but a goal-driven, "teleonomic" talent. They are capable of acting as their own genetic engineers.

In fact, they utilize the same tools as modern science's genetic tinkerers: plasmids, vectors, phages, and transposons. Should the colony's strategy of group hunt and peck prove useless, the messages sent back to the center do not unleash new waves of migrants. They become the raw data for genetic research and development.

Ben Jacob was curious to determine just how inventive the genomic-resculpting process could be. Did bacteria with their backs to the wall merely plug in prefabricated twists of DNA and revert to ancestral strategies? Or could they create solutions which were entirely new? The Israeli physicist-tumed-microbiologist explains how he administered microbial ingenuity tests. *"We tried exposing bacterial colonies to conditions so novel that the creatures could never have encountered them before. Tough conditions, conditions of life and death. We wanted to know how inventive they could be in reworking their genetic code.*

For example, we took bacteria that cant move on agar but are able to roam freely in liquid. We put them on the wilderness of their worst nightmares, agar, and deprived them of food. The need to branch out in search of grazing land was a true creative challenge." By forming a modular network beyond the supercomputer and retooling the very

genome at their heart, the massed experimentation teams were able to solve the problem.

So the networked minds of computer visionaries' dreams replicate one of the most ancient life strategies on this earthly sphere.

Beyond mere networking lies another futuristic vision-that of the global brain. Here, too, the microbe has by far outdistanced humankind. Bacteria and their frequent enemies, the viruses, have long since mastered the art of worldwide information exchange. Both swap snippets of genetic material like humans trading how-to books. This system of molecular gossip allows microorganisms to telegraph an improvement from continent to continent. And the nature and speed of communication can be awesome.

Let's take some modern examples. Viruses are such effective collectors of genetic parings that they've been known to clip and paste molecular material from whales to sea gulls, from monkeys to cats, and in the lab can transfer firefly genes into the cellular control panel of tobacco leaves, inspiring shaggy greenery to glow in the dark. Bacteria also benefit from this worldwide system of genetic mix and match.

In modern times, members of the microbial sisterhood have demonstrated the power of their information splicing. During the 1980s, newborns in modem hospitals unexpectedly died of pneumonia. Adults recovering from surgery came down with mysterious infections. The problem was not limited to one small spot. Patients in Germany, France, the United States, and Japan were besieged by new forms of bacterial attack. Most baffling of all was the fact that the bacteria pulling off these surprise assaults seemed capable of developing resistance to half a dozen antibiotics nearly overnight.

A clinic in Tokyo would report that bacteria had suddenly shown an ability to storm the defenses erected by the formerly impregnable drug streptomycin. At almost the same time, a hospital in San Francisco would announce that the bacteria in its corridors seemed to have mastered the same dismaying trick.

The genetic equivalent of data-base sharing had allowed viruses and bacteria to outrace scientists networked by telephones, computers, international conferences and journal articles. And the new techniques the global microbial brain concocted were devilishly clever. For example, beta-lactam disrupts the construction of the bacteria's outer wall. Once pharmaceutical companies had perfected beta-lactam-producing antibiotics, they regularly changed their discoveries' composition to overcome bacterial evolution. The race between researchers and their microbial adversaries began in 1942. Scientists were in the lead for decades. Then the bacteria finally outpaced the researchers.

The beta-lactam antibiotic functioned by destroying a bacterial enzyme called beta-lactamase. Infectious bacteria countered by borrowing the instructions for impervious forms of beta-lactamase from non-infectious strains or by developing impregnable new varieties of their own.

Tetracycline, another formerly sure-fire disease killer, had been a drug of choice in the 60's, 70's, and 80's. But by the 90's tetracycline was almost entirely ineffective. This antibiotic did its trick by sabotaging bacteria's pivotal protein synthesizers. The bacteria countered by developing a pump that literally spat the antibiotic out.

Today's microorganisms can move so quickly because they piggyback on two advantages their primordial relatives did not have - the ability to snatch useful genetic twists from millions of different species; and the helpfulness of high speed aircraft in transporting innovations from one population center to another.

But do not underestimate the potential reach of the microbial net in pre-Cambrian times. The odds are good that the earliest microorganisms rode planet-sweeping currents of wind and water.

And scientists have already discovered eleven different bacterial types whose age seems to go back well overthree billion years. Given the newness of these findings, this eleven are likely to be revealed in the next decade as the merest sliver of proto-biotic life's diversity. In all probability, then, the microbial global brain-gifted with long-range transport, data trading, genetic variants from which to pluck fresh secrets, and the ability to reinvent the genome itself-came into existence some 3.5 billion years before the birth of the Internet.

Ironically, future multi-cellular forms would come to land and sea with a plethora of new capabilities. Their microbial neighbors would continue to use the global brain. But despite the fact that net-worked intelligence would remain a key to the more "advanced" species' survival, it would take roughly 1.5 billion years of trial and error before the global brain would rise among the "higher animals". ..along with the early spread of tools of stone. *c8*

The Divisions of Precambrian Time

http://www.ucmp,berkeley.edu:80/precambrian/precambrian.html

You can find out more about the Precambrian by clicking on the chart that is on this web site!!!

4.5 billion years ago, the Earth was born. Nearly 4 thousand million years passed after the Earth's inception before the first animals left their traces. This stretch of time is called the Precambrian. To speak of "the Precambrian" as a single unified time period is misleading, for it makes up roughly seven-eighths of the Earth's history. During the Precambrian, the most important events in biological history took place. Consider that the Earth formed, life arose, the first tectonic plates arose and began to move, eukaryotic cells evolved, the atmosphere became enriched in oxygen - and just before the end of the Precambrian, complex multicellular organisms, including the first animals, evolved.

Welcome To The New Web Lift for Geologic Time!

http://www.ucmp.berkeley.edu/help/timeform.html

This web site has info pages connected to each of the periods represented here. This contains a wealth of information provided by the The Museum of Paleontology (UCMP) which is located on the campus of the University of California at Berkeley in The Valley Life Sciences Building.

Precambrian (4,500 to 544 million years ago (MYA)

- **Hadean** (4500 to 3800 MYA)
- **Archaean** (3800 to 2500 MYA)
- **Proterozoic** (2500 to 544 MYA)
- **Vendian** (650 to 544 MYA)

Phanerozoic (544 MYA to today)

- **Paleozoic Era** (544 to 245 MYA)
  - **Cambrian** (544 to 505 MYA)
    - **Tommotian** (530 to 527 MYA)
  - **Ordovician** (505 to 440 MYA)
  - **Silurian** (440 to 410 MYA)
  - **Devonian** (410 to 360 MYA)
  - **Mississippian** (360 to 325 MYA)
  - **Pennsylvanian** (325 to 290 MYA)
  - **Permian** (290 to 245 MYA)
- **Mesozoic Era** (245 to 65 MYA)
  - **Triassic** (245 to 208 MYA) **Jurassic** (208 to 146 MYA) **Cretaceous** (146 to 65 MYA)
- **Cenozoic Era** (65 MYA to today)
  - **Tertiary** (65 to 1.8 MYA)
    - **Paleocene** (65 to 54 MYA)
    - **Eocene** (54 to 38 MYA)
    - **Oligocene** (38 to 23 MYA)
    - **Miocene (**23 to 5 MYA)
    - **Pliocene** (5 to 1.8 MYA)
  - **Quaternary** (1.8 MYA to today)
    - Pleistocene(1.8 MYA to 11,000 years ago)
    - Holocene (11,000 years ago to today)

ARTICLE:

by David Stevens

Bimodal Theory in Context

Chance's bimodal theory is the latest in a variety of schemes which differentiate one social structure or psychological state from another or others. The principal difference between these and bimodal theory lie in the empirical basis of the latter. Social structure is revealed in attention structure through dominance or spatial relations.[1,2,3,4]

Notions that the two modes, hedonic and agonic, are associated with the potential of individuals to hold either material resources (RHP) or the assumed resource of social attention (SAHP) have become part of bimodal theory, including Price's proposed definition of the modes in terms of competition for these resources. Analyses of interpersonal relations[5] and chimpanzee social feeding under natural or artificial provisioning[6] have identified a mechanism enabling a switch between modes, dependent on circumstances. Most recently, the modes have been employed in an analysis of commercial organizations,[7] and have been identified as archetypes in an evolutionary account of psycho-pathology.[4]

Other theoretical approaches may serve to inform the development of bimodal theory, by setting a theoretical context. Its heuristic value will be enhanced, as will those of other accounts, by setting forth a conceptual field within which they may be distinguished and related.

Community and Society:

Distinctions between forms of social organisation are not new, nor are theories of social order. Providing a theoretical background for the two modes, Chance refers to Tinnies' differentiation[9] of gemeinschaft from gesellschaft - community, involving team work, free association and shared ownership of tools, goods, and products - from society, involving exclusive groups, amongst whom the benefits of labour are restricted to the labourers themselves, by virtue of their proclaimed ownership of tools and right to exploitable resources, and connoting the idea of social rank.[10]

The Social System:

Talcott Parsons analyses social structures as organised about types of evaluative action orientation, and 'the variable of self- collectivity orientation which is 'concerned with the fabric of the relational structure itself, not the properties of the objects which enter into those relationships'.[11]

Parsons describes 3 such types: instrumental, expressive, and moral. In general, later authors neglect the 'moral' type, but refer to distinctions between 'instrumental' and 'expressive' orientations. In Parsons' scheme, the distinction between 'private interests' and 'collective obligations' (the self-collective variable) is related to each of the three types of orientation for evaluation and action, but the moral type is less distinctive than the other two, seeming to share some of their characteristics, or to include both *in toto.*

'Orientation-role types', exemplify each of these three primacies along the self-collective dimension. Social actors assume attitudes through these in relation to evaluation of others and action in regard to them - 'alter' is Parsons' term - which seems like Mead's[11] 'generalised other[1]. 'Alter[1] seems to be an actual member of a 'congener' class.[13,14]

In Parson's 3 types, the primacy of private interests orients individuals to each other; (1) instrumentally 'primarily as a source of facilities, i.e., acquisition of rights to instrumental possessions or services, "contractual" or cooperative'; (2) expressively 'as a source of rewards, i.e., rights to relational possessions and other possessions as symbolic of them';

and; (3) morally 'in terms of "private morality," i.e., their respective ego-integrative standards. These may or may not be deviant relative to institutionalized collective moral standards'. [14(page144)]

The collective interest, by contrast, involves the individual in an instrumental role performing 'functions sanctioned as obligation to the conectivity' and orients each individual instrumentally to alter 'within the collectivity primarily as a "cooperating" colleague. Collectively, the expressive role involves the performance of sanctioned expressive functions, and the individual is expressively oriented towards alter 'as "comrade" with whom reciprocity of sentiment is shared'. Parsons refers to this type of structure as 'the gemeinschaft'.[14(page 145)]

Moral primacy involves 'both instrumental and expressive content of obligations to the collectivity (e.g., most kinship roles). With clear cut primacy in either direction this type would slip over to' one of the others. 'Obligation to collectivity is not merely a matter of "performance of duty" but of solidarity of sentiment'.[14 (page 144)]

It seems, thus, that the moral type of orientation-role is not different by degree from the others, which seem to stand in clear relation to each other, but is of a different class, standing in distinct relation to the others as a pair. It could indeed be construed as a separate dimension within the scheme, on which individuals and collectives may vary from highly moral, conforming to and experiencing social cohesion, to amoral, without such interdependence, characterised by alienation and anomie.

Further, the collective orientation appears more closely aligned with the expressive role function, and the private with the instrumental, in the sense that there is less consideration of the other's integrity and equivalence to self at both individual and collective levels - negative regard - and greater exploitation of others. Parsons' scheme may be represented in a simplified form, with an implicit moral factor, as a system of self-other relations with two orientations (private and collective), and two corresponding role-functions (instrumental and expressive), operating at two levels of social action (individual and collective), as set out in **Table 1.**

Table 1. Self-other relations in Parson's social system.

		Primary Orientation of Self to Other	
		Collective	**Private**
Social Level	**Collective**	Source of rewards, prestige.	Source of facilities, services, & power.
	Individual	Source of rewards, relational possessions. Relations as a comrade.	Source of facilities, services, instrumental possessions. Relations as a collegue.
		Expressive	**Instrumental**
		Role-function in relation to others	

So, if we return to the aim of setting bimodal theory in context of Parson's analysis of social systems, the modes and the types seem to relate with ease: the hedonic with a collective view expressively articulated, the agonic as instrumentally self-oriented. Thus, in the hedonic mode individuals are collectively oriented and expressive, and in the agonic mode they are self-oriented and instrumental. Groups behave likewise.

Where concern for others' values exists, the individual and the group are moral, and both modes seem to imply a degree of this moral concern; therefore when no such concern exists, is inhibited or over-ridden, the individual or group position is relatively amoral. Morality, so construed, expresses a variable of relative social concern, and the two modes are accounts of social relations, to which this variable is relevant only at its moral pole. An amoral individual or group which regards neither self-conscience nor collective rules is not acting socially, that is, in relation to others within the bounds of mutually recognised principles of obligation and permission, and in such relations the modes do not apply. **Table 2** shows how bimodal theory can be mapped onto Parson's social system.

Table 2.
Context of Chance's modes with Parsons' social system variables.

	MODE	
	Hedonic	**Agonic**
ORIENTATION	collective	private
ROLE-FUNCTION	expressive	instrumental

A recent schematic model similar to Parsons', and seeking also to summarise and incorporate a large body of research and theory, has been made by Fiske, who proposes four elementary forms of social relations.[15]

Forms of **Social** Relations:

How does bimodal theory correspond with the proposed four forms of social relations? Each considers questions of social perception and personal cognition, and both are concerned with the consequences of ranking and sharing; each provides an account of how cultures evolve through social comparison. In each theory, the notion of inter-individual assessment and evaluation is fundamental, and accounts of social behaviour are adduced in support of this principle. Can the two modes be reconciled with the four forms?

Tinnies' distinction between community and society, amongst many others, is cited also by Fiske, who proposes that humans employ four forms of social relation, which, like Chance's two modes, express fundamentally different structures of cognition, motivation, and behaviour.

These forms refer to ways in which the exchange of material resources occurs, and follow in complexity the familiar levels of psychophysical measurement -categorical, ordinal, interval, and ratio scales. An implicit dimension linking these forms in two opposed pairs is type of competition, raised by Price[16] as a defining characteristic of the modes, and independently identified by Pierce & White[7] in a similar role. A reconciliation of these ideas provides more support for the bimodal theory.

Fiske proposes four elementary forms of social relations, defined in terms of resource allocation: communal sharing (CS) with no notion of individual property, equality matching (EM) where individual property is recognised and divided equally, market pricing (MP) in which individuals attend to and assess their relative worth in terms of some assumed standard, and authority ranking (AR) in which the shares are unequally distributed through a dominance hierarchy.

Fiske's model derives from anthropological studies of social organization and notions of psychological function, whilst Pierce & White apply a similar method to the analysis of modem commercial

organisations in ecological terms, incorporating as an essential principle the distinction between the two modes. Each of these proposals tries to account for phenomena in which relations change, and each suggests that competition for resources is a significant factor. Competitive relations, and the nature of the stakes, the potential loss or gain to each party, in terms of psychosocial structure, have been important issues in the development of bimodal theory, and the gist of these notions will provide a basis for further consideration.

Following from Chance's original discovery, in which the idea of competition did not explicitly occur, it appeared that competition might be relevant to the two modes, and that relations between individuals might change in a sudden, abrupt, switch from one mode to the other.[2,5,17] Later independent studies have confirmed these notions.[6]

Social Attention and Social Appraisal:

Relations between individuals in the two modes involve social appraisal of each person in relation to other people. Chance has defined this in terms of the deployment of social attention. It reflects in patterns of social order. Social appraisal can be both (1) qualitative, is this other like me?-(2) quantitative, how much like me? - questions that have been dealt with by Tajfel's social identity theory[18] and by Kortmulder's behavioural field theory;[19] Fiske also proposes social appraisal to be a fundamental process.

Social appraisal occurs differently in the two modes. In the agonic mode it is with respect of access to material and reproductive resources through the threat or use of direct interindividual force, whereas in the hedonic mode it is for prestige in the estimation of spectating others. This contrasts resource holding potential (RHP) with social attention holding potential (SAHP).

Competition for dominance rank and command of resources rather than social approbation or prestige has recently been identified as a distinguishing feature of the two modes by Price who earlier proposed the mechanism of a bimodal switch. Power has provided an analysis of evidence from chimpanzees of such a switch, which appears to be related to unduly constrained competition for material resources, while an inverse relationship between interindividual distance and dominance in resource competition
has been experimentally demonstrated with macaques.[20]

Resource availability and social relations:

Chance noticed a shift from hedonic to agonic modes in the apparent evolution of human societies from non-food-accumulating foragers through food-storing communities, from shifting to fixed agriculture, from nomadic to local herding, and eventually to non-subsistence forms. This has also been observed by Pierce & White in contemporary commercial organizations.[7]

In resource fields where available resources are clustered, more predictable and more visible, individuals and groups adopt delayed return acquisition strategies and tactics of dyadic contest. Where resources are scattered, less predictable and less visible, immediate return strategies and scramble tactics prevail, in which all have equal resource access, and none can restrain others nor evict one who has acquired the resource.

A principle of exclusivity for access to resources operates through this sequence, as does the association between material and social difference. This association tends to occur in all human groups, and is recognised by the assertively egalitarian foraging groups who do not accumulate food and who explicitly discourage any attempt by one member to rise in material wealth or in social status.[21] This has been taken to be the ideal human expression of the hedonic mode, and the distinction between immediate return and delayed return ecological styles 'may be critical to the emergence of the hedonic or agonic mode of social structure in human communities.'[7(page14)]

Table 3. Context of two modes with Fiske's four elementary forms of sociality

Agonic Mode	**Hedonic Mode**
Material Resources (RHP)	
competitive ----------	cooperative
AR authority ranking	communal sharing
CS MP market pricing	equality matching EM
rank----------	prestige
(SAHP) Social	

Within these groups no inequity is allowed for any material resource, nor any given status. In Fiske's terms they display communal sharing (CS) and equality matching (EM) as structural motivations, which emphasise similarity. Agonic groups, by contrast, exhibit authority ranking (AR) and market pricing (MP), each of which implies the notion of maintaining difference.

In terms of the patterns of resolution for material resource control (RHP) and psychosocial status (SAHP) the modes relate to the forms as in **Table 3.**

The distinctions observed above are not absolute; they differentiate by degrees between states which may never perfectly be distinct. The differences between rank and status are subtle and their relations complex; likewise most interactions are neither exclusively competitive nor cooperative but progress through mutual negotiation in various domains, perhaps by a process of consensual refraining.[22] However, it seems that differences in rank and resource control are settled through dyadic contest, with some permanence, whilst degrees of prestige are allowed by consensus from time to time without necessarily entailing relative resource provisions. This bimodality of competition reflects again the distinction between two fundamental orientations, towards others as instruments for one's own welfare, or as mutually-beneficial members of a community.

Agency and Communion:

Through a psychotherapeutic career, David Bakan came to recognise a fundamental distinction between life processes, one directed for the benefit of the individual, acting and using others as agents for personal benefit, or the other for the benefit of the group, with communal interests prior to personal goals.[23] He defines them thus:"/ *have adopted the terms 'agency' and "communion' to characterise two fundamental modalities in the existence of living forms, agency for the existence of an organism as an individual, and communion for the participation of the individual in some larger organism of which the individual is a part. Agency manifests itself in self-protection, self-assertion, and self-expansion; communion manifests itself in the sense of being at one with other organisms. Agency manifests itself in the formation of separation; communion in the lack of separations. Agency manifests itself in isolation, alienation, and aloneness; communion in contact, openness, and union. Agency manifests itself in the urge to master; communion in*

noncontractual cooperation. Agency manifests itself in the repression of thought, feeling and impulse; communion in the lack and removal of repression. One of the fundamental points which I attempt to make is that the very split of agency from communion, which is a separation, arises from the agency feature itself-, and that it represses the communion from which it has separated itself." **(pages 14-15)**

Bakan points to the significance of his distinction in terms of reproductive relations expressed through sex differences in functional role. *"If we think of agency and communion as two major functions associated with all living substance, then, although agency is greater in the male and communion greater in the female, agency and communion nonetheless characterise both."* (page 153)

Relations between the sexes present "a *fundamental model of the integration of agency and conununion. It is largely the agentic in the male and the communal in the female which bring them together. However, in the contact between the sexes over time, there is the cultivation of the integration of agency and communion between them. The ideal marriage which one may conceive of is then one in which, through the integration of agency and communion which takes place between the marriage partners, a corresponding integration takes place within each of the partners."* (pages 152-153)

Bakan's ideas have been taken up through investigations of interpersonal relations, and especially the psychology of gender. Block has discovered clear evidence in a cross-cultural set of samples of the expressions of agency and communion in the socializing influence applied to children by their parents.[24] According to the child's sex in relation to their culturally-defined sex-role, there are a "constellation of qualities an individual understands to characterize males and females". (page 512) Buss has pointed to the negative aspects of masculinity and femininity as expressions of unmitigated agency and communion respectively, measured in terms of dominance and submission, and socially undesirable in both sexes.[25] Both Chance's and Bakan's distinctions have been used in an analysis of the social psychology of rape.[26]

The Agentic State:

Milgram's work on obedience to authority demonstrates that the principle of individual agency and its interpersonal expression has been the agentic state.[27] Under what conditions will a person obey the instructions of another and be prepared to do harm to a helpless stranger? When a person's actions can be accounted for 'by denying any personal involvement and attributing his behaviour exclusively to an external requirement imposed by authority.' (page 115)

Where a subject is alone with an experimenter issuing instructions which appear to brook no dissent, the subject can explain his or her actions simply as agents of a socially powerful other. Milgram has referred to this condition as characterised by an agentic state, in which a person 'becomes different' from his or her 'former self, 'with new properties not easily traced' to the former personality.

The *"entire set of activities carried out by the subject comes to be pervaded by his relationship to the experimenter; the subject typically wishes to perform competently and to make a good appearance before this central figure. He directs his attention to those features of the situation required for such competent performance. He attends to the instructions, concentrates on the technical requirements of administering shocks, and finds himself absorbed in the narrow technical tasks at hand. Punishment of the learner shrinks to an insignificant part of the total experience."* (page 143) This appears not unlike the condition of a low-ranker in the agonic mode, whose attention is directed thoroughly towards, and whose cognition is filled by, a single, focal, powerful other.

A shift to the agentic state is possible only through the subject's perception of a 'legitimate source of social control within a defined social occasion'.

Here 'the legitimacy of the occasion itself depends on its articulation to a justifying ideology.' Such an ideology could be articulated through any set of social conventions giving one individual authority over anotherwithout the neccessity for further justification, such as in a functional hierarchy or an interpersonal relation of inequality; such an 'authority system'(page 142) consists of at least two people who share 'the expectation that one of them has the right to prescribe behaviorforthe other.'(page143) In such circumstances, so long as the subject (subordinate) recognises and accepts the ideology, instructions from the experimenter or other authority (dominant) compliance is easily exacted in the form of 'willing obedience.' (page142) This proposed system and its characteristic state have much in common with the agonic mode, and resembles an extension of the instrumental primacy through the agency of another.

Individualism-Collectivism:

A dimension of individualism-collectivism has been proposed by Hofstede,[28] developed by Triandis et. al.,[29] and measured by Hui,[29] which resembles those of Parsons and Bakan in distinguishing between both action and motivation, in these terms. An important discovery in this field has been that, across a variety of cultures and groups, collective motivation (that is, towards the benefit of the group as a whole and those within it) extends only to the boundary of the group. Relations between groups, even when both are internally collectively-orientated, are usually characterised by individualistic, instrumental, or agentic cognitions and actions.

The individual-collective dimension is implicit also in Chance's bimodal theory, but since his and other theories deal with intragroup living, it is perhaps better to account for intergroup phenomena through a psychology of social relations within and between groups, such as social identity theory.[31]

Social Identity Theory:

Like Chance's bimodal theory, Tajfel's social identity theory seeks both to examine the distinctions between individuals in social relations and to account for the psychosocial processes which carry through these distinctive states.[32-33] Further, each theory is empirically based in the field of social attention; relations between group members are indicated by their respective directions and qualities of attention, and are mediated by a process of social comparison, in which each evaluates others according to social degree and material worth.

Whilst in-group relations may be of various forms, relations between groups are categorically and qualitatively distinct: for any group (comprised of those individuals who, separately or commonly, identify themselves with the group) other in-group members no matter how ordered by each other, take precedence over all those identified as belonging to the out-group. Members of the in-group are regarded by each other as having distinctive characters, whereas out-group members are perceived as relatively uniform; in-group members and their attributed characteristics are more highly valued than any of the out-group.

When competition occurs between groups for resources, these cognitive biases affect interpersonal behaviour to the extent that, in an intense struggle between human groups, each will label the other as sub-human or non-human, alien in some sense, and so justify its atrocities against the other.

It is this process of social identification, amplified through intergroup competition for scarce resources, which may result in the unfortunate consequences of artificial provisioning of chimpanzees under human observation in the Gombe reserve, noted by Power, in which previously peaceful groups and individuals became mutually competitive and aggressive through frustrative non-reward.[6]

Such a clear change between one and another type of social relation, from one where individuals acknowledge and treat each other as differentiated persons, to that where individuals perceive and interact with each other only as anonymous representatives of a negatively-valued out-group, is analogous to the in-group modes of relation de-

scribed by Chance. This leads to the conclusion that the modes may be extended beyond intragroup relations and applied to intergroup relations through the moderating factor of resource competition between groups and group members from the same species, which we might term meta-group relations. In a meta-group, lower-ranking groups attend to the higher, and remain at a distance from them, whilst higher-ranking groups command from them greater access to material resources.

Social and Psychological Differentiation:

The fundamental process at work in social relations is one of differentiation within and between wholes. A similar process has been described in the perceptual field, a process of differentiating figure from ground, or one object from others, in essence part from whole. This construct of field dependence -independence (FD-I) represents also a process of psychological differentiation between persons through their social roles, and has been shown to have a basic implication in human social ecology.

Reviewing over 500 cross-cultural studies of sex differences in psychological differentiation, [34,35,36] van Leeuwen found them to follow a pattern reflecting the division of labour between the sexes; those which accumulated food least showed least sex-role differentiation in subsistence labour, and least disparity between the sexes in degree of psychological differentiation.[37] This is important, since it shows how differences in a fundamental cognitive process may be systematically biased in individuals, according to social and material relations within the group and the ecological relations of the group to its environment.

FD-I is assessed through a variety of visuo-spatial tests, such as requiring the respondent to orientate a rod vertically within a rectangular frame (Rod-and-Frame Test), both apparatus and respondent being in an experimental room perhaps itself tilted from true gravitational vertical (Body Adjustment Test), to separate a given geometrical figure from a more extensive and complex ground embodying several such implicit figures (Embedded Figure Test), or to conceptualize the human body 'in relatively complete detail and one in which the body parts are perceived as discrete, yet interrelated in a definite structure'.[34]

"In the cognitive area, differentiated functioning is characterised by an ability to switch from habitual to new problem-solving strategies, and in the social area, by minimal attention to available social cues for guidance and support. Finally, in the emotional area, those functioning at a more differentiated level are said to be more impersonal, socially distant, and individualistic, and in situations of conflict to employ relatively specialized defense mechanisms, such as isolation and intellectualization, rather than undiffer-entiated repression or denial. Again, the underlying variable linking these performance indices is taken to be the extent to which items (including the self) can be perceived as discrete and separate from their contexts -be it a geometric design, a logical problem, a social system, or an emotional situation." [37] (page 89)

Van Leeuwen coded the chosen studies according to the principles used by Barry et. al., in examining the archival material on human social economies in terms of whether food was accumulated through surplus (agricultural and pastoral) or not (hunting, fishing and gathering).[38] High food accumulating societies showed a greater tendency for psychological conformity to rules and roles, through child socialization practices emphasising obedience and social responsibility, than did low food accumulating societies, which developed and expressed personal 'achievement, self reliance, and general independence'.[37] (page 93)

Field studies of psychological differentiation have found a similar relation between higher food accumulation and greater field dependence, or lesser differentiation.[39,40,41] An ecological hypothesis proposed to account for these findings, holds psychological differentiation to be negatively related to degree of food accumulation. It further relates the nomadic lifestyle, requiring constant perceptual reappraisal of the environment, to the development of a differentiated cognitive style, through the medium

of the *"loose social structure and minimal hierarchy present in moving groups, the generally less harsh socialization practices, and in many cases.... by survival requirements which demand constant perceptual re-articulation of a little-differentiated snowscape, savannah, or desert environment."*[37] **(page 96)**

Barry et. al., had indeed revealed such relations, between food accumulation and compliance training, size and fixity of settlement, political integration, and complexity of social stratification.[38]

Van Leeuwen extends the hypothesis to include sex-role differentiation, which aligns with higherfood accumulation, since 'the relatively greater freedom of women in more nomadic hunting-gathering societies will result in lesser sex differences in performance on differentiation tasks, whereas the restrictiveness of agricultural groups will produce greater sex differences in performance'.[37] (page96)

Reviewing relevant studies, Van Leeuwen found that only two out of twenty-six low-food accumulating societies showed significant sex-differences in cognitive style, in both of which females were more differentiated than males, whereas in twenty-nine high food-accumulating societies fourteen showed significantly greater psychological differentiation (field-independence) in males, none in females, leading her to conclude that'subsistence style heavily influences socialization style, which in turn influences cognitive style in the culture generally and in the sexes more particularly' since 'what influences a society generally towards social conformity (and hence greater field-dependence) affects the females of that society more strongly.' [37] (page 115)

The Field of Psycho-Social Relations:

Low food-accumulating human groups do not differentiate themselves, individually or collectively, from their environments; they construe the world, including humans and all other forms of life, as a whole and undivided dynamic field.[21,42] Only with more specialised ecological arrangements do humans distinguish themselves qualitatively from their physical environment and from other living organisms.

Whilst a view of the world as a collection of relatively independent and self-determined entities may yield simply testable predictions about their interactions, it may not be capable of accounting for systematic variations in such collections. Field theory attempts to do so through considering the interdependence rather than independence of entities, and the relations between local and universal conditions. In particular, field theory tries to account for stable states of organization, local or universal, in terms of interactivity, and to specify the processes which underlie any switch from one to another state within the field.

Stable states imply orderly relations within the field. Order is the fundamental property of conceptual and material realities; without order no structure or form could emerge. All perceptible forms and structures exemplify, embody, enfold, or imply a particular order of a given degree of complexity. Orders of a very high level of complexity appear to be chaotic or random, but may enfold within themselves more elementary orders which are implicate within the whole. A world-view appropriate to field theory in physics, of the universe as 'undivided wholeness',[43] is identical to that reported of the Mbuti, and proposed as a fundamental principle of relatedness in hunter-gatherer societies between people in social groups, and connecting people with the rest of the natural world, all embodied in "the cosmic economy of sharing".[44]

Within a field the principles governing the whole govern the activity of each part, each expressing an implicate order, and in dynamic systems small local variations may affect the order of the whole field. Field theory is multiply deterministic, and not reductivist, capable of generating more satisfactory predictions than mechanistic accounts of such phenomena as complex learning.[45] Complex social issues such as crime may be elucidated through an approach based upon evolutionary ecological principles and chaos theory,[46] which is

'a misnomer' for a form of field theory seeking to identify the conditions under which apparently disorderly activity within a system becomes variously patterned, rather than tending to entropic chaos.[47]

A thoroughgoing application of chaos theory to self-organising systems in psychology has only just begun, but promises much for the future development of bimodal theory.[48] Sudden changes of state may be described in terms of the implicit order in a dynamic system, expressed as attracting the system's components into one or other stable pattern of interactivity, but with an inherent dynamic (chaotic) instability between stable states. Jungian archetypes have been described as 'attractors' of this type,[49] and Anthony Stevens (personal communication) has proposed that the two modes are 'transcendent archetypes'.

Thus the two modes may represent the expression of the characteristic attractor in social relations, in which both individuals and their groups co-exist in either of two stable structures, influenced but not determined by environmental conditions, and will switch between them as a consequence of both internal and external factors. Such applications of field theory may provide a new way forward in the development of bimodal theory.

Bimodal Theory , Speculative Prehistory, and Current Anthropology - a cautionary note:

Whilst an association between the hedonic mode and the foraging way of life seems reasonable, as does that between the agonic mode and hierarchical societies, a question persists about the supposed evolutionary sequence of psychosocial structures. In general, it is assumed that agonistic relations prevailed early on in evolution, the governing principle being competition through physical means, whether power in males, or maternal potential in females, and that these produced ranked social structures. These were, in some primates, superceded by hedonic relations in which affiliation prevailed, in turn producing unranked flexible societies.

Foraging groups value individual autonomy but vigorously assert the collective right to pull down, expel, or kill individuals who act solely in their own interests, or who are violent.[50] Boehm proposes that the egalitarian state existed before the hierarchical, and that these counter-dominance strategies reveal a recourse to evolutionary earlier phases, both within and across primate species.[51]

Similar comparisons between humans and other primates have been made in terms of male violence and intergroup sociality,[52,53] and on a number of 'species-neutral' dimensions,[54] which have thrown up doubts about the evolution of primate social relations. All of these contributions mention a distinction between hierarchical coercive social relations and flexible affiliative interactions. Some claim that the latter form of social structure is not accounted for in the primatological literature. There is no mention of the two modes.

Further, the idea that present human societies have always existed as they now do may be mistaken, as subsistence styles are responsive to changes in resource availability and population pressures and are being interchangeable between foraging, cultivation and herding,[55] and the notion that present non-industrial societies represent relicts of earlier universal evolutionary stages is increasingly questioned. This may be merely an archaeological and anthropological invention of prehistory along uniform and teleological lines leading to an illusorily perfected present.[56]

If an evolutionary perspective on the modes is to be taken, then these cross-species and cross-cultural issues must be addressed - did either mode come first? Could they not both be potential in many species, including humans, and each expressed with greater or lesser vigour according to circum stances? Could evolutionary theory now accommo date the principle, first expressed and illustrated by Kropotkin, of cooperation as well as that of compe tition in assessing the relative fitness of social groups and their individual members?[57] *c8*

ARTICLE:

by Lynn E. O'Connor, Jack ***W. Berry, and Joseph Weiss***

Survivor Guilt, Submissive Behavior, and Evolutionary Theory

The authors wish to thank Paul Gilbert for his tremendous help in the development of this research and paper. A full report on this theoretical perspective and recent research is currently being prepared for publication.

In prior research submissive behavior has been studied in relation to social comparison theory and evolutionary theory and has been understood to be associated with a fear-based self-protective response to an agonistic interaction with a higher ranking person.[1] Submissive behavior has been viewed as a person's response to a threat from a more dominant or aggressive person, as a means to reduce the threat and protect the self from injury.[2-14] In a recent study we introduced another psychological mechanism frequently associated with submissive behavior, that is the subtle and often unconscious type of guilt associated with believing that one is better off than others, often referred to as "survivor" or "outdoing" guilt. This is the kind of guilt that we tend to feel when we hearthat a friend is suffering from a misfortune such as a serious illness, a loss of a job, or when we see a homeless beggar on the street. In a study of 199 subjects, we found this type of guilt to be significantly associated with submissive behavior.

In addition to being a response to an external threat, submissive behavior may also be a strategy that a people use when they are suffering from survivor guilt towards others, when they feel better off and worried about making others feel bad, simply by comparison. In order to make things more equal, people suffering from survivor guilt may in some instances behave submissively and thus it may serve to preserve a degree of equality. Individual variations in proneness to survivor guilt may serve to promote and support social organization, in that some individuals are more comfortable being better off than others, and thus are more able to tolerate leadership positions while others, with a higher proneness to guilt, are more comfortable as followers. In this way survivor guilt may also serve to contribute to the maintenance of peaceful social organization. We suggest that survivor guilt is a psychological mechanism that has been maintained in human populations through natural selection, and may be explained by inclusive fitness theory,[15] reciprocal altruism,[5,16] or selection at the level of the group. Group selection has recently re-emerged as a legitimate factor in evolutionary theory, to be considered along with other levels of selection, [17-21] and survivor guilt may represent a viable adaptation to group living.

Our focus on survivor guilt began with the clinical focus found in the interpersonal cognitive theory of psycho-pathology and psychotherapy developed by Joseph Weiss (often referred to as Control Mastery Theory), and tested empirically by Weiss, Sampson and the San Francisco Psychotherapy Research group.[22] According to Weiss, psychopathology stems from pathogenic beliefs that arise in response to traumatic childhood experiences. These beliefs warn people that if they attempt to pursue some normal developmental goal, they risk harming themselves or someone they love. While in many psychological theories the emphasis is on the fear of harm to the self, Weiss proposed that often the most inhibiting pathogenic beliefs relate to the fear of harming others; and these altruism-based beliefs are most often quite unconscious. He suggests that people develop severe pathogenic inhibitions in response to these beliefs predicting harm to others, in an effort to avoid or minimize guilt. For example, a person who in childhood experiences her mother as weak and unhappy may develop the pathogenic belief that if she is strong and confident it will make her mother—or by generalization, others—feel inadequate, simply by comparison. This person may then —in compliance with this pathogenic belief— find herself exhibiting submissive behaviors, as if she were weak, in order to avoid feeling guilt. Weiss has suggested that many psychological problems and symptoms result directly from these types of pathogenic beliefs, and particularly those that

lead to a high proneness to survivor guilt. In orderto investigate this focus on interpersonal guilt, described as the fear of harming others, and particularly on survivor guilt and its role in the development of psycho-pathology, we constructed a measure of guilt, the Interpersonal Guilt Questionnaire (IGQ-67), with subscales of survivor guilt, omnipotence guilt, separation guilt and self hate. We then conducted a series of studies involving over 800 subjects and found that interpersonal guilt was significantly correlated with most psychological problems, including depression and other symptoms found on measures of psychopa-thology, and more general personality problems such as pessimism, perfectionism, and jealousy.[23,24] Our investigation supported our emphasis on guilt, and in contrast to the contemporary focus on shame, in many cases we found that survivor guilt was more significantly associated with emotional problems than was shame.

A review of the literature revealed antecedents to survivor guilt in higher primates, and particularly Chimpanzees and Bonobos. While we do not know if other primates actually experience guilt, there is evidence for the tendency to share material resources with others,[25-34,] De Waal[26] and others have described food sharing —both in the wild and in laboratory conditions[35,36] — with food going from those who have to those without. This type of behavior was not found in lower primates, suggesting that survivor guilt may be a more recent behavioral adaptation to group living. In higher primates a proneness to guilt and especially to survivor guilt may be a psychological mechanism that provides the proximate motivation for this sharing behavior, while the overall adaptive motivation may relate to inclusive fitness, reciprocal altruism and group selection. A cross cultural review suggests that a proneness to survivor guilt may be prevalent or even universal among people, and may be more conscious and integrated into social behavior in the equalitarian hunter and gatherer societies, than in most western industrialized societies.[37-38,39,40,33,41]

In our recent study linking survivor guilt to submissive behavior we administered the Interpersonal Guilt Questionnaire (IGQ-67), the Submissive Behavior Inventory,[1] the Eysenck Personality Questionnaire-Revised,[42] and the Automatic Thoughts Questionnaire,[43] to a sample of 199 college students. The results of our study demonstrated that submissive behavior was associated with survivor and omnipotence guilt, as well as with the fear of put-downs as measured indirectly by the extraversion subscale of the EPQ- Revised. A principal components analysis was calculated on the correlation matrix of scores on submissive behavior, survivor guilt and extraversion. These results support our hypothesis that there may be two motivational states related to submissive behavior; the fear of harm to the self as it has been describe in prior studies, and the fear of harm to another, or guilt-based submissive behavior. In submissive behavior mediated by survivor guilt, a person may behave submissively in order to reduce their feelings of being better off than someone else, rather than to reduce the aggression of what they perceive to be a more powerful person. In this case the danger is internal, that is guilt-related anxiety. In both cases the submissive behavior represents an inhibition on assertive or aggressive behaviors, in part coming from within. These results support the existence of both guilt (or other) based and fear (or self) based submissiveness.

This study has possible clinical relevance. When clients exhibit submissive behaviors, it might be important to ascertain whether they are submissive in response to an unconscious worry about being better off than others, or if they are submissive in response to fear of someone higher than themselves. This suggests that a case-specific approach may be useful. In the case of fear/self-based submission, it might be most important clinically to provide very specific and reality based discussion of their concrete situation, with a willingness to engage in problem solving techniques. If a patient's submissiveness is guilt/other-based, it might be more effective to help them to become more aware of their worries about surpassing other people and the inhibitions derived from these concerns.

The attempt to understand survivor guilt in the context of evolutionary theory is consistent with the results of this study. A further review of anthropological and biological literature, as well as further empirical investigations with human populations are indicated.

ABSTRACTS & CRUNCH...

Editor's Note: The first item is an article that was "crunched", by ASCAP member, Beverly Sutton, the other 4 items in this section are abstracts.

Baringa, M.: Social status sculpts activity of crayfish neurons. *Science* 1996;271:290-291.

Yeh, Fricke, and Edwards (Georgia State University and Emory University) found that there is a neuron in crayfish that responds to serotonin differently depending on the social status of the animal. Serotonin will enhance firing of the lateral giant neuron (LGN) in dominant animals and suppress firing in subordinate animals. (The LGN produces the tail-flip reflex which is seen fighting and escaping.) This is the first study that links a social behavior to a change in a specific synapse.

Fernald, et. al., at Stanford University, found that that a dominant social status enlarged the neurons of male cichlid fish, and this resulted in hormone release that stimulated sexual organs. Kravitz and Livingstone at Harvard University injected lobsters and crayfish with serotonin and the animals showed aggressive dominant behavior. Fricke at Emory University injected serotonin into young crayfish, and found that the reflex was increased was raised alone or was the biggest in their group. Yeh allowed crayfish to fight to determine dominance, dissected the animals, and tested the serotonin effect on the LGN. Serotonin increased excitability of the LGN in dominant animals and suppressed excitability in subordinate animals. Yeh and Edwards found that stimulating one type of serotonin receptor makes the LGN less excitable and another type of serotonin receptor increases excitability.

Yeh then put two subordinate crayfish together to determine which one was dominant over the other. Two (2) weeks later, the dominant one of this pairing had increased rather than decreased excitability of the LGN by serotonin. Dominant animals were placed together to determine which one would become the submissive. The submissive animal of this pairing was slow to give up dominant physiology, tended to fight (and be killed), and still had serotonin excitability of the LGN 1 month after the pairing. Femald's male cichlid fish showed similar results.

In lobsters, the LGN produces the tail-flip and also excites other neurons, resulting in a flush of serotonin. Kravitz and Livingstone linked this to aggressive behavior in lobsters and crayfish. Edwards has yet to study this, but thinks the serotonin flush may occur in crayfish. Kravitz, et. al., have studied octopamine (a neurotransmitter) which produces submissive behavior when exposed to serotonin.

Barbara Sutton, M.D.

Meerio **P.; Overkamp, G.J.F.; Benning, M.A.; Koolhaas, J.M.; & Vandenhoofdakker, R.H.: Long-term changes in open field behaviour following a single social defeat in rats can be reversed by sleep deprivation. *Physiology & Behavior* 1996;60(1):15-119**

Abstract: The long-term consequences of a single social defeat on open field behaviour in rats were studied, with special emphasis on the time course of stress-induced changes. Animals were subjected to social defeat by placing them into the territory of an aggressive male conspecific for 1 hour. After the defeat session experimental animals were returned to their home cage and their own room, receiving no further cues from the resident. Other animals serving as controls were placed in a clean and empty cage for I hour. Five-minute open field tests were performed on days **1,**2,7,**14,** and 28 after

defeat, with independent groups of rats. Locomotion of the animals was recorded and analyzed with an automated video system. Social defeat resulted in a strong subsequent reduction in open field activity, which lasted till at least 7 days after the conflict. Differences in total traveled distance were no longer significant 2 weeks after the conflict. The latency for moving to the outer ring of the open field arena after the start of the test was still significantly longer 4 weeks after defeat. The stress-induced reduction in open field locomotion could be reversed by 12 hours sleep deprivation during the resting phase, an intervention known to have antidepressant effects in humans. Possible relevance of the present findings with respect to human affective disorders is discussed.

Meerlo P.; Deboer, S.F.; Koolhaas, J.M.; Daan, S.; & Vandenhoofdakker, R.H.: Changes in daily rhythms of body temperature and activity after a single social defeat in rats. ***Physiology & Behavior*** **1996;59(4-5):735-739**

Abstract: The long-term consequences of social stress on daily rhythms of body temperature and activity in rats were studied by means of radiote-lemetry with intraperitoneally implanted transmitters. Rats were subjected to a single social defeat by placing them into the territory of a male conspe-cific for I h. Social defeat caused a sharp subsequent reduction in the amplitude of the daily temperature rhythm, which lasted for at least 4 days. The reduced amplitude was mainly due to higher temperatures during the circadian rest phase, i.e., the light period. Movement activity was less affected, but the decrease in activity during the dark phase after defeat correlated significantly with the temperature increase during the light phase. The stress-induced changes in daily rhythms of body temperature and activity are discussed in terms of their relevance to the role of rhythm-disturbances in the pathogenesis of affective disorders.

Schaub, H: Dominance fades with distance: an experiment on food competition in long-tailed macaques ***(Macaca fascicularis).*** ***Journal of Comparative Psychology*** **1995;109(2):196-202**

Abstract: Dominant animals often can suppress the competitive behavior of subordinates by overt aggression or by their mere presence. This experiment on pairs of long-tailed macaque females explored whether this effect of dominant animals is influenced by interindividual distance. A dominant and a subordinate, but stronger, animal could compete for food by a tug-of-war on a bar. The animals were separated by 2 grids, spaced at either 30 or 100 centimeters. At 30 centimeters, 7 of 8 subordinate subjects either did not pull the bar or did not obtain a major share of the available food. In contrast, at 100 centimeters, all subordinate subjects obtained more food than the dominant. Thus, the dominant animal could suppress the competitive behavior of the subordinate only at the short interindividual distance, despite the fact that the dominant could not approach or attack even at the short distance and could be fully seen by the subordinate even at the large distance.

Knight, C; Power, C; & Watts, I.: The human symbolic revolution: a Darwinian account. ***Cambridge Archaeological Journal*** **1995;5(1):75-114**

Abstract: By 50,000 years ago, the effects of a 'symbolic explosion'- an efflorescence of human art, song, dance and ritual - were rippling across the globe. Applied to archaeological evidence, standard neo-Darwinian theory offers new understandings of this improbable event. The present article defines 'symbolism', models quasi-ritual behaviour in late archaic Homo sapiens, extends the argument to the emergence of anatomically modem humans and concludes with preliminary tests against archaeological, ethnographic and rock art data.

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