 Psicologia (1989) VII, 1: 7-9

Fears and phobias

ISAAC MARKS *

It was once said that there are there types of psychiatrists and psychologists — those who are brainless, those who are mindless, and those who are both. The first were said to be typified by psychotherapists who cling to the black box view of behavior. Such narrowness of discipline is less true today but it is still hard to cross boundaries, partly because the literatures are so separated. Nowhere is the need for better integration of the behavioral sciences more evident than in the study of fear.

Advances in biology, ethology, genetics, physiology, pharmacology, psychology, and psychiatry have deepened and widened what we know about normal fers and rituals. The behavioral revolution has enabled formerly unrelenting phobic and obsessive-compulsive disorders to yield to treatment and — the final sophistication in therapy — has allowed many sufferers to help themselves. Even prevention is in sight.

Knowledge has grown about the many influences, from conceptiou onward, on the development of normal and abnormal fear, the nature of fear-related syndromes, how clinicians can alleviate these, and some of the mechanisms involved.

«Fear» denotes any response that is usually defensive or protective, along with its bodily and (in humans) subjective concomitants. The subjective elements are a late evolutionary addition to a rich repertoire of protective behaviors across phyla. In this broad sense tear includes, both the defensive behaviors of invertebrates and the frightened fantasies of man. This general concept of fear contrasts with the way some researchers us the term to indicate purely physiological or subjective components of protective responses but not their accompanying motor behavior, such as avoidance or freezing.

A broad perspective may make obvious what is hidden from a single viewpoint. Learning theorists took a long time to recognize what ethologists took for granted from the start — that according to their phylogenetic heritage, species differ greatly in their defensive responses and the situations that evoke them. The same stimulus may evoke terror in one species but be ignored by another, and species vary widely in the ease with which they learn to fear particular classes of stimuli. Such phenomena were ignored by learning theorists in their search for universal laws of learning made by Thorndike as long ago as 1898.

The evolutionary background of a species can be critical in interpreting experimental results; for example, visual cues may rapidly induce food aversion in day feeders like quail but taste cues are more effective in the nocturnal rat. Few of the wide variety of natural fear behaviors and fear-evoking stimuli as well as the relevant environmental contexts and internal states of the organism have been studied experimentally. All too commonly a single response, stimulus, context and internal state are studied over a short period of time, with inevitable loss of perspective. Experimentalists can benfit from the insights of

* Professor de Psicopatologia Experimental, Universidade de Londres.

biologists, ethologists and clinicians working in the natural environment. Broader vision would bring faster advance.

Human beings are unique in some respects but not in others, and this has to be borne in mind when comparing emotions in man with those in other species. Creative links are possible if we remain aware of our evolutionary heritage of brain and learning mechanisms as well as sociocultural capacities. We should not only compare closely allied species but also remember that behavior can converge across different taxa in the face of commom pressures and dangers. Similarly, there are important continuities and discontinuities between normal and clinical phenomena.

Resistance to studying the evolutionary background of human behavior carries a penalty, as Gould (1982) pointed out:

«The myth of ourselves as completely separate creations, divorced from our biological inheritance, has created an egotistical blindness to analogies which open the way to new and important discoveries about how we live and learn. (...) We cannot know where, during the course of evolution, our increasing mental capacities spawned the will that now battles with our genes for control fo our behavior (...) [but] our genes still have a powerful hand in our affairs; (...) we should be treating ourselves as one of many interesting species. (...) The conviction that humans are infinitely plastic in all times (...) is especially debilitating and open to ethological revision. (...)We must learn more about the behavioral programs specified in ourselves in order to circumvent thosethat, in our present social environment, predispose us to inhumane actions» (Gould, 1982, p. 541).

And, I would add, to unwarranted fears.

Recent progress has strengthened links among such diverse behavioral sciences as genetics; biology; neuro- and psychophysiology; neurochemistry; psychopharmacology; ethology; developmental, experimental, and clinical psychology; psychiatry; and sociology. These links help us understand mechanisms behind normal fear and anxiety disorders. Clinical phobias have a nonrandom distribution that suggests our phylogenetic predisposition to fear special evolutionary dangers. Examples are infants' fear of strangers rooted in infanticide from the outgroup, toddlers' fears of heights and animals stemming from dangers faced by the young as they become mobile, and agoraphobia, which involves hazards met in venturing outside one's territory.

Other connections soften the distinction between «innate» and «learned» behavior. Many innate releasers of fear and «fixed» fear action patterns noted by early ethologists have been shown by psychologists to be modifiable by experience. Behavior with a genetic base thus need not be immutable in the way that was once thought. Conversely, not all effects of experience are reversible; early visual deprivation can lead to lasting structural changes in the optical system of kittens.

Interdisciplinary insights can thus connect apparently unrelated events. The tendency for sensitization to be associated with intermittent stimulation, and tolerance or habituation with continuous stimulation, is a widespread phenomenon seen in the acquisition and extinction not only of fear and rituals but also of epilepsy, drug addiction, and allergies. Understanding the influence of neuropeptides on fear may help us explain some mysteries about the onset and fluctuation of clinical phobias and rituals. Treatment research into these problems using antidepressant drugs and behavioral methods suggests better ways to classify those disorders and hints at biochemical substrates that may be involved. Knowing that withdrawal from noxious stimulation, habituation to repeated stimulation, and simple learning are all already present in unicellular protozoa has led to a search for similar cellular mechanisms across phyla that mediate withdrawal from danger. Cell biology is linking up with psychology and even psychotherapy in elucidating the molecular biology of defensive and other learning.

Some defensive mechanisms may be as fundamentally similar across phyla as the many metabolic reactions that we share with other taxa (Schopf, 1978). Our ability to obtain energy by glycolysis — breaking down glucose into pyruvate — is shared with anaerobic bacteria and evolved more than 1.5 billion years ago. With more recently evolved aerobic organisms we share a newer more efficient way of obtaining energy by respiration utilizing oxygen. This still begins with the ancient anaerobic process of glycolysis but thereafter continues as the citric acid cycle of reactions that break down pyruvate and incorporate oxygen to produce carbon dioxide and water. Respiration became possible once plants evolved a capacity for photosynthesis, which released free oxygen that accumulated in the atmosphere and water. The same pattern of early anaerobic followed by later aerobic steps is seen in the reaction sequences used by our bodies to synthesize sterols and fatty acids.

A common metabolism leads to common dangers. Cyanide poisons protozoa as much as it does people because it inhibits similar respiratory processes. Oxygen is vital for respiration and therefore for protozoa and people, but it is a poison for anaerobes that do not respire.

Our layered evolutionary history might be read not only in our basic metabolism (and embryology — it has long been accepted that ontogeny partly recapitulates phylogeny) but also in our psychophysiology and behavior. Ancient neuronal processes of habituation and sensitization may be widespread across taxa and superimposed on these in younger species like humans may be newer neural mechanisms of defensive learning.

In the area of fear behavior the move has hardly begun from natural history into quantitative evolutionary biology. Little is known about the extent to which fear repertoires have been shaped by strategies like selfishness, altruism, cooperation and nepotism, all of which affect reproductive sucess. A begining is the demonstration that nepotism predicts the frequency of some alarm calls from mammals. Stranger fear in infants may have evolved as a protection against abuse and infanticide by conspecifics behaving selfishly.

The use of terms such as strategy, ploy, selfishness, and nepotism does not imply that animals make conscious choices. These terms are shorthand expressions to indicate mechanisms by which natural selection might work — animals behave *as if* they are selfish, altruistic, and so on. Strategies are programs, recipes or subroutines for action that animals carry out in the way a computer obeys its program (Dawkins, 1982). Natural selection can be imagined as acting on a pool of alternative strategies of defensive behavior. Individual organisms are temporary executors and propagators of these strategies. Those strategies which win out when individuals compete with copies of themselves are evolutionary stable strategies (Maynard Smith, 1978).

There is an interesting imbalance in the literature on defensive behavior. Textbooks of ethology usually devote little space to the subject and few ethologists review the area, despite their numerous articles on various aspects of fear. In contrast, for experimental psychologists and psychiatrists fear is a favorite topic, one that has been reviewed many times and forms a substantial proportion of the entire literature.

One point is neglected in most writings. Fear is traditionally seen as selected by pressure to escape predators of other species. This is, of course, vital, but an additional crucial selection pressure tends to be played down in the shaping of fear — that from conspecifics. Anyone watching groups of mice, monkeys or men interacting can see that in everyday life most fear reactions are shown to conspecifics rather than to other species. Social influences have probably been far more important in the evolution of fear than the attention devoted to it might suggest.

The literature relevant to fear has grown enormously since 1969, when the author published *Fears and Phobias* as an attempt at synthesizing what was then known. A computer search for articles from 1967 to 1984 with «phobia», «fear», «avoidance or escape behavior», or «obsessive-compulsive» in their titles yielded 11,000, and recently 1,000 articles a year have been appearing. In the last 7 years more than 46 books have been published by professionals about fear and fear-related syndromes, if we exclude the many new volumes dealing solely with stress and nonsituational anxiety. Only the book edited by Sluckin (1979) united some of the work of ethologists, experimentalists, and clinicians, whose disciplines tend to stay separeted instead of fertilizing one another. The area continues to need more integration.

A host of analogies present themselves when we see that humans are not only unique but also have features from a heritage shared with other species. Some analogies will be fruitful, athers less so. Juxtaposing related fields can stimulate controlled speculation, testing of which will show what is productive. New ideas are emerging that may lead to better models uniting separate disciplines and explaining formerly obscure features of fears and rituals.