

THE SOCIOBIOLOGICAL IMAGINATION

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Psychiatry

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Psychiatry is the speciality of medicine devoted to the diagnosis and treatment of mental and behavioral disorders. These disorders range widely: from chronic schizophrenia to temporary insomnia, from infantile autism to geriatric dementia, from inherited defects to normal reactions to stress. Psychiatric treatments are accordingly diverse and include psychoanalysis, psychotherapy, behavior therapy, medications, and electroconvulsive therapy. In contrast to psychologists, whose extensive education emphasizes the study of cognition, psychodynamics, learning, and behavior, psychiatrists first prepare for the practice of general medicine and then take four or more years of residency training to learn to diagnose mental disorders. In decades past, we psychiatrists were pitied by colleagues in other areas of medicine who felt we could do little to help our patients. Now, psychiatrists and their new therapeutic powers are increasingly envied by other medical specialists.

Psychiatry in the 1960s, just emerging from the dominance of psychoanalytic ideology and unrealistic hopes for changing society, was scrambling to reestablish itself as a respectable specialty of medicine. It sought not only increased effectiveness and scientific acceptance, but also to establish psychiatric disorders as medical diseases eligible for insurance reimbursements. These goals were strongly advanced by the discovery of effective drug treatments, first for psychoses and depression, later for anxiety and mania, and most recently for

obsessive compulsive disorder and panic disorder. They were further advanced by new diagnostic nomenclatures and the development of new research methodologies, including radio-immunoassay, advances in molecular biology, and exotic techniques of looking inside the functioning brain, such as positron emission tomography.

Federal funding grew rapidly for research in these areas. In fact, in academic psychiatry, research on the biology of the brain has so prospered that it has largely displaced the study of psychological conflicts and adaptations. These changes in mainstream psychiatry help to explain, for reasons to be discussed later, psychiatry's slowness to incorporate recent advances in evolutionary biology.

ADVANCES IN EVOLUTIONARY BIOLOGY THAT BENEFIT PSYCHIATRY

The greatest contribution an evolutionary perspective can offer to psychiatry is to show how the functions of psychological traits can be scientifically studied, and thus to begin to provide, for psychiatry, what physiology provides for the rest of medicine. In the rest of medicine, the search for evolutionary explanations based on function is intrinsic to everyday practice and research. The physiologist demarcates the respiratory, circulatory, and immune systems, not by their anatomy, but by their functions. The surgeon knows the functions of the gallbladder, and therefore the consequences of removing it. When a patient presents with renal failure, the internist knows the functions of the kidneys and thus how to compensate for renal insufficiency even if its etiology is not known.

The psychiatrist has, however, no comparable body of knowledge. The psychiatrist does not know the normal functions of the systems disrupted by mental disorders, except in the most general terms. For example, when a patient presents with depression, the psychiatrist does not know the normal functions of the capacity for mood and therefore has difficulty in distinguishing between normal and pathological sadness. When a patient presents with extreme jealousy, few psychiatrists understand its evolutionary origins and functions. Evolutionary biology offers psychiatry the conceptual tools

needed to construct a framework for understanding normal mental function akin to that which physiology provides for understanding the normal functions of other bodily systems.

Attention to the "adaptive" significance of behavior is not a new aspect of psychiatry. Adolf Meyer, the founder of the Phipps Clinic, in 1913, at Johns Hopkins, was the first to advocate the term psychobiology and one of the first to base psychiatric evaluation and practice on a systematic assessment of the patient's adaptation to life. Strongly influenced by Darwin, he emphasized the relationship between symptoms and disruptions of a person's current adaptive strategies (Willmuth 1986). More recently, psychoanalysts and marital and family therapists have studied the adaptiveness of certain symptoms. Most of them, however, have studied psychological adaptation. Biological adaptation, the focus of evolutionary studies, is a different concept; it refers to the ways in which a trait increases reproductive success.

Darwin's great achievement was to explain the origins of adaptations as the products of natural selection, gradually shaped to give their bearers some advantage in the desperate competition for survival and reproduction. The additional advance that gave rise to sociobiology was the discovery that the struggle is not among species but, ultimately, among genes (Hamilton 1964; Williams 1966; Wilson 1975; Dawkins 1976). Before sociobiology, behaviors were usually explained by vague reference to their benefits for the species. Now the task is more exacting—to demonstrate how the genes that code for a trait increase their own representations in future generations.

This insight has turned many assumptions about behavior topsy-turvy. Altruistic behaviors that were previously easy to explain in terms of their benefits to the species, such as cessation of reproduction in response to overcrowding, became mysteries. Apparently pathological behaviors that were previously inexplicable, such as killing of infants by male langur monkeys who take over a harem, became expected strategies. And some apparently maladaptive psychiatric symptoms appear markedly different in the light of sociobiology. Normality can no longer be defined by happiness and social harmony; instead, capacities for sadness and tendencies for self-serving behavior may be biologically "normal," if they increase fitness.

The task of evolutionary psychiatry, one just getting underway, is to explain the functional significance of psychopathology. In this chapter, it is not possible to mention all the relevant papers, or even all the areas of current work, so I will limit my review to a summary of progress in several areas where sociobiology is influencing the understanding of psychopathology, with emphasis on those in which further advances can soon be anticipated. For inclusive reviews, see Wenegrat's *Sociobiological Psychiatry* (1990); McGuire's article "Sociobiology: Its Potential Contributions to Psychiatry" (1979); Feierman's symposium "The Ethology of Psychiatric Populations" (1987); "The Overlapping Territories of Psychiatry and Ethology," by Kramer and McKinney, Jr (1979); and works by Gilbert (1989) Thayer (1989), and Marks (1987).

KINSHIP RELATIONS

Attachment

Just before the main advances in evolutionary behavioral biology were recognized, John Bowlby, in his 1969 book *Attachment and Loss*, made a strong case for the biological importance of attachment for the survival of infants. Harry Harlow (1971), with his famous studies of "surrogate mothers" in rhesus monkeys, had likewise demonstrated that attachment is not a derivative of other impulses, but an independent capacity with adaptive significance (1971). Newer studies of attachment by Hinde (1974); Ainsworth, McBléhar and Waters (1978); and Emde and Gaensbauer (1981) are explicitly based on the evolutionary paradigm and have documented the ontogeny and characteristics of separation anxiety in its various forms. Nonetheless, they are presociobiological in that they do not incorporate the discovery that selection acts mainly at the level of the individual. For instance, patterns of attachment characterized as "abnormal" might, in fact, be highly adaptive when viewed from the point of view of an infant trying to get investments from an unengaged mother (Barbara Smuts, personal communication). And abnormalities of mothering that are socially unacceptable may, nonetheless, be expected responses when the mother's fitness is best served by abandoning her baby.

Child Abuse

Not investing in an offspring can, in certain circumstances, increase a mother's Darwinian fitness. For example, the cessation of ovulation in women with anorexia nervosa may result from a mechanism shaped by natural selection for preventing pregnancy in times of famine (Surbey 1987). The inhibition of ovulation caused by lactation serves the related function of spacing births to minimize the number of children who are born while an older sibling still requires all the milk the mother can provide.

That natural selection acts to benefit genes and individuals instead of species is gruesomely illustrated by the actions of a male langur monkey that takes over a harem. He usually kills any existing offspring that are still nursing (Hrdy 1977). The females try to prevent this, but when they fail they quickly come into estrus and mate with the new male, thus increasing their reproductive success and that of the male, who then protects his own offspring. Although no such automatic mechanism explains the behavior of humans, children living with step-parents are much more likely to be abused than children living with both natural parents. In fact, as Martin Daly and Margo Wilson have shown in their recent book, *Homicide* (1988a), children of stepparents are a hundred times more likely to be killed than others. It appears that the psychological mechanisms that usually protect children from such violence when both natural parents are present are less effective in reconstituted families. The implications of these findings are just being considered by child protection agencies.

Marriage

Marriage is as close to a universal as there is in human cultures. The most common pattern of human marriage has been polygyny, while a minority of cultures practice something close to monogamy. An evolutionary analysis of marital relationships reveals intense commitment and cooperation between spouses to produce and raise offspring, but also intrinsic conflicts that arise from the differences in male and female reproductive interests (Symons 1979, Buss 1989). This difference consists primarily in the fact that women can have

only a limited number of children and their reproductive success is restricted mainly by the availability of resources and protection. Men can have many children, even in a single year, and their reproduction is restricted mainly by the availability and cooperation of sexual partners. Women and men must cooperate to succeed, but the different strategies available to them inevitably also cause conflict.

These insights have had remarkably little impact on marital therapy, where harmony is often assumed to be elusive only because of distorted perceptions, imperfect communication, and individual psychopathology. This false belief makes many people feel dissatisfied with marriages that are, in fact, better than average. People interpret their urges to act in ways that are in their reproductive interests, but not in their spouse's interests, as arising from psychopathology, instead of as expected impulses that must, for the most part, be inhibited for the sake of the marriage. I believe that when the intrinsic nature of conflict in sexual relationships are finally acknowledged, the impact will be far-reaching and might conceivably decrease the vicissitudes of marriage.

RECIPROCITY AND RELATIONSHIPS

One of the most powerful subtheories to emerge from socio-biology analyzes relationships as reciprocal exchanges. People benefit from relationships not only with those who have genes in common (Hamilton 1964) but also with those who can exchange favors in ways that result in a net gain (Trivers 1971, Axelrod and Hamilton 1981, Axelrod 1984). The negotiation of such relationships is the key to human social success, and social success is crucial to reproductive success (Cosmides and Tooby 1989; Tooby and Cosmides 1989; Alexander 1979, 1987). The patterns of social exchange are enormously complicated because deception and defection are ever-present strategies. When is it wise to cooperate, when to defect, and when to deceive? How can one tell that the other is going to continue to cooperate, to be loyal, to defect, or to cheat? From such difficulties come many of the problems people bring to psychiatrists. Many psychiatrists try to help people to improve their capacity to negotiate such difficulties in relationships,

but only a few know that a new theory exists to analyze the adaptive significance of such situations. Attempts to apply reciprocity theory to psychiatry are just beginning (Essock-Vitale and Fairbanks 1979, Littlefield and Lumsden 1987, Glantz and Pearce 1989, Lloyd 1990).

Neurosis, Character Disorder, and Reciprocity

A reciprocity framework offers insights into the relationship between neuroses and character disorders (Nesse 1990a, Nesse and Lloyd 1991). The neurotic cooperates even when it is senseless to do so. Guilt and obligation motivate excessive altruistic behavior that is rarely fully reciprocated. This tends to attract exploiters, who soon justify the neurotic's sour view of human nature. The neurotic expects too much from people, continually hoping that they will offer him a benevolent relationship like a parent once did, and continually being disappointed.

In contrast, the person with a character disorder either expects too much in return for a small investment, or expects nothing at all. Those who feel entitled to help without having to reciprocate are called "narcissistic," while those who have lost all hope for secure and mutual relationships are described as schizoid isolates or sociopathic manipulators. An evolutionary approach does not explain these disorders or their etiology, but it does suggest that we could understand them better by studying how the innate capacities for negotiating relationships interact with individual experience to shape personalities. For example, children who grow up in small, isolated, nuclear families may come to have very different, and often idiosyncratic, expectations about relationships, compared to those who must early negotiate relationships with many other children.

EMOTIONS

Psychiatrists treat emotional disorders, so one might expect that they would be intensely interested in theories of normal functions of emotions. But such theories are still developing and are just coming to the point of clinical utility. The promulgation of evolutionary approaches to emotions has especially been assisted by the efforts of R. Plutchik (1980) and the

contributors to the series *Theories of Emotions*, which Plutchik edited with H. Kellerman in the 1980s. Most of these theorists now view the emotions as useful states that have been shaped by natural selection, and a number go further to suggest the specific ways in which different emotions contribute to fitness. To date, this foundation for a scientific understanding of emotions and emotional disorders is little known in clinical psychiatry.

The functions of different emotions—fear, love, anger, and others—may be analyzed by considering them to be akin to computer programs that adjust the organism to cope with different situations (Nesse 1990a). For instance, the diverse components of panic and agoraphobia—physiological arousal, concentration on escape routes, flight, avoidance of closed places, staying close to home—make sense as a pattern shaped to facilitate escape from, or avoidance of, mortal danger (Nesse 1988). An evolutionary explanation of mood may at first seem unlikely. Sadness just doesn't seem useful. But sadness may serve functions in hierarchy negotiations (Gardner 1982, Raleigh et al. 1983, Sloman and Price 1987) regulation of arousal (Thayer 1989) or alternation of broad life strategies (Gut, 1989). Also, mood might be explained as a mechanism that allocates resources as a function of the propitiousness of the social environment (Nesse 1990a). Low energy and pessimism can be useful if they conserve resources for a time when they will offer a better return on investment. An adequate theory of mood awaits progress in measuring social resources and discovering how they contribute to reproduction, how they are tallied in the mind, and how their changes influence mood.

The main problems that people bring to psychiatrists are emotions—anxiety, sadness, anger, guilt, and all the rest. It is painful emotions that people most want to change. The first principle of an evolutionary view of emotions is that *uncomfortable feelings do not necessarily indicate the presence of an abnormality*. Like pain and nausea, anxiety and sadness seem to be capacities shaped by natural selection to counter threats to fitness. The next step, one just now being taken, is to specify the exact functions of each emotion in the situations for which it was shaped. Such an understanding of the function of emotions is crucial for psychiatry, which has so far tried to

bypass this step and has thus studied the mechanisms of the mind/ brain without a deep understanding of what they are for

PSYCHODYNAMICS

Psychodynamics is the field that studies high-level mental processes, especially those that are unconscious. Psychoanalysts have explored the unconscious mind for nearly a century, with only rough maps of the territory. Back on the level of conscious thinking, they compare notes and argue about fine points, even as they agree on certain core features of the landscape—conflicts between impulses and inhibitions, ego defenses, Oedipal wishes, castration anxiety, and penis envy. Other scholars, many of whom have never visited this realm, are skeptical of the whole enterprise. Psychoanalysts have not spent their time trying to convert such skeptics, but have more often argued amongst themselves in institutes increasingly divorced from academic psychiatry.

Psychoanalysis may conceivably find, in evolutionary psychology, an opportunity to join the mainstream of science. If the patterns of the unconscious mind are considered to be traits shaped by natural selection that serve specific adaptive functions, then it should be possible to analyze them, just like other biological traits (Leak and Christopher 1982, Badcock 1986, Rancour-LaFerrier 1985).

The unconscious is itself an excellent target for evolutionary explanation. It first seems odd that natural selection would shape mental mechanisms specifically to keep us unaware of our own impulses, until we realize that the mind is shaped not for accuracy, but for fitness. If distortion and self-deception have increased fitness, then their presence in the human mind is an expected adaptation, not a mistake. Hence their absence must be recognized as a disorder. Some kinds of obsessive disorders could conceivably result from just such a lack of subjectivity. Such ideas profoundly challenge the rationalist foundations of psychiatry. Psychiatrists generally believe, in accord with the larger culture, that rationality and self-knowledge are normal and good. Indeed, psychopathology is said to result from being out of touch with oneself, and overcoming self-deception is a goal of psychotherapy. No doubt

it will be difficult to dispassionately assess the possibility that objective self-knowledge is sometimes toxic.

Alexander (1979) and Trivers (1976) suggest that the ability to deceive oneself may be adaptive because it increases one's ability to deceive others. They think the unconscious might have evolved to allow people to appear cooperative while nonetheless seeking personal advantage without even knowing it (Lockard 1980, Slavin 1985). This suggestion seems to me profound but too narrow. I have argued (Nesse 1990b, Nesse and Lloyd 1991) that while self-deception can facilitate manipulation, it can also offer profound benefits in the maintenance of good relationships. Robert Frank (1988) has persuasively marshaled the evidence for this position in a book that analyzes emotions from the viewpoint of economics (see chapter 5, "Economics," this volume).

Other psychodynamic phenomena are also susceptible to evolutionary explanation. Slavin (1985) explains regression as a strategy children use to elicit resources from parents by appearing to be younger than they really are. Badcock (1990) interprets the Oedipal complex as a strategy in which children use precocious sexual signals to manipulate parents into providing extra resources. Efforts have also been made to explain castration anxiety, penis envy, and many other psychodynamic phenomena (Badcock 1986, 1990; Rancour-LaFerrier 1985). Only a few people are pursuing this radical endeavor, but they may eventually provide psychodynamics with a biological foundation, and evolutionary psychobiology with access to the insights of psychodynamics.

Triver's (1974) recognition of parent-offspring conflict is another advance with special applications in psychiatry. Psychiatry has usually expected normal maternal love to be pure and unambivalent. But Trivers notes that the reproductive interests of mother and offspring are congruent only early in infancy. The time soon comes when the mother's fitness would be maximized by having another child, while the existing child's fitness is best served if the mother waits. The child manipulates the parent mainly by deception. This deception takes the form of the child's appearing to be less mature (and thus more needy) than is actually the case, so as to make the

parent believe that its interests are best served by continued high investment. This pattern may explain not only the "terrible twos" but the general phenomenon of regression (Slavin 1985, Trivers 1985). Why do we find regressive behavior so annoying? Perhaps because we intuitively know that it is often a deceptive manipulation designed to get us to provide more resources than we otherwise would.

PERSONALITY

Different kinds of personality may be understood as individual characteristic emotional and cognitive strategies for negotiating interpersonal relationships (Buss 1987, Kofoed 1988). The social emotions are excellent candidates for "Darwinian algorithms," the term used by Tooby and Cosmides (1989) to describe the innate rules that regulate mind and behavior. Friendship and love maintain good relationships, even through rough periods. Anger prevents exploitation and may, paradoxically, help to preserve relationships. Anxiety and guilt, those most common, most aversive, and most socializing of emotions, motivate people to fulfill their commitments, to abide by the social contract, and to stay loyal to their friends. Because socially unacceptable desires (such as the desire to cheat) are especially likely to remain unconscious, it is not surprising that we often find it hard to say why we are anxious. Such anxiety is uncomfortable and unaccountable, but not abnormal.

We know that many personality attributes are strongly heritable, and it is thus tempting to interpret personality types as alternative strategies for getting along in the social world. Tooby and Cosmides (in press) have recently shown, however, that this is most unlikely. They argue that the multiple aspects of personality are almost certainly controlled by different genes, and constellations of genes that constitute a particularly good strategy would be split up by genetic recombination in every generation. Individual differences caused by genetic variation will usually, they argue, turn out to be of relatively small adaptive significance. This strikes me as one of the more profound insights evolutionary psychology has offered psychology and psychiatry.

SUBSTANCE ABUSE

Substance abuse is one of the more thorny problems faced by psychiatry. Is it a disease or just a behavior pattern? Is it a medical issue, a moral issue, or something else? Research efforts are unraveling the brain mechanisms by which drugs give pleasure and relieve mental pain, but a broader, evolutionary understanding of the functions of pleasure and pain is needed, I believe, to answer our questions about substance use.

The adaptationist approach I have been outlining assumes that the capacities for mental suffering are products of evolution that are usually useful. Therefore, using drugs that block these capacities should generally make individuals less fit. Of course, mental suffering is not always a part of the organism's solution to a problem. Some anxiety and depression is caused by brain abnormalities, and many bad feelings are no longer useful in our current environment. Deciding which bad feelings are useful, and which are not, becomes an urgent practical issue as we develop drugs that relieve them without dangerous side-effects or physiological dependency. A sensible debate about how such drugs should be used will be possible only when we have a solid theory of the evolutionary origins and functions of the emotions.

NEUROSCIENCE AND PSYCHIATRIC RESEARCH

Psychiatric research now mainly studies neurophysiological mechanisms, in hopes of finding chemical abnormalities that cause mental disorders. While some mental disorders are certainly caused by brain defects, it is my guess that many neurophysiological "abnormalities" are merely aspects of the operation of evolved mechanisms that mediate normal anxiety and sadness. Thus, searching for the causes of anxiety in the anatomy and chemistry of brain centers that mediate anxiety may turn out to be like searching for the cause of cough in the brain centers that cause cough. If anxiety and sadness, like cough and pain, are defenses shaped by natural selection, then understanding the proximate mechanisms that mediate them is a worthy goal but is no substitute for understanding how they defend us, and the cues and algorithms that regulate them.

PSYCHIATRIC DIAGNOSIS

Psychiatric diagnosis has changed drastically in the past twenty years, starting with the subjective interpretation of symptoms in the context of various theories, and culminating in categories based on observation and induction, as free from theory as possible. This change has been a great advance for research. Psychiatric diagnosis, especially when based on a structured interview, is now fairly reliable. Researchers at different centers can now report their findings with reasonable confidence that they will also apply to patients who receive the same diagnosis elsewhere.

The cost of this reliability, however, is a diagnostic system that is well characterized as "mindless," not only because it is not based on any theory of etiology, but also because it focuses attention on objective, observable, and measurable aspects of psychiatric conditions, at the expense of attention to cognitive, psychodynamic, and experiential factors. A more insidious consequence of the new diagnostic system is its tendency to encourage psychiatrists to think of diagnostic categories as if they were diseases. If such carefully defined, objective, and reliable categories are approved by the American Psychiatric Association and required by insurance companies, and if researchers use them to search for etiology and better treatments, then it is difficult for the clinician to resist the unjustified belief that each is a distinct disease with a specific cause.

An evolutionary perspective may help to prevent this logical leap. By providing a way to distinguish those aspects of disease that are manifestations of defects of the body's machinery from those that are adaptive responses to a threat, an evolutionary approach decreases the tendency to confuse diseases and symptoms. In the general medical clinic, cough, fever, and high white blood cell count are recognized as signs and symptoms of lung infection that are defensive responses, not the disease itself. At one time, physicians argued about how to define the subtypes of "cough disorder" just as we now do for the anxiety disorders, dividing them inductively on the basis of onset, family history, course, and associated findings. For cough, such nomenclatures have been replaced by diagnoses based on etiology.

For anxiety, however, comparable diagnostic categories remain elusive. This is, at least in part, because the etiologic factors that elicit anxiety are less specific than those that elicit cough. Anxiety is not primarily a defense against threats as simple as a pathogen or even loss of homeostasis, but against the loss of reproductive resources, loss of status, and loss of strategies that have previously been effective. Because the significance of such losses depends on the individual person, it is extraordinarily difficult to show the relationship of life events to mental symptoms.

Categories of mental disorders based on their adaptive significance are no substitute for understanding the specific causes of psychopathology, but they may help to broadly conceptualize the causes of mental disorders (see table 1).

Table 1

CATEGORIES OF MENTAL DISORDERS
BASED ON EVOLUTIONARY PSYCHOBIOLOGY

1. Primary brain abnormalities (caused by genetic abnormalities, infection, toxins, developmental factors, etc.) that result in malfunction either in basic mental processing (for example, schizophrenia), or in regulation of the expression of adaptive responses (for example, manic-depressive disorder).
2. Maladaptive behavior patterns that arise from normal brain mechanisms, as a result of exposure to novel environmental circumstances or idiosyncratic learning histories (for example, addictions, some anxiety states, fetishes), or the imperfection of the evolved programs of the mind.
3. Patterns of emotion or behavior that are painful or socially unacceptable, but nonetheless adaptive (for example, failure to fully attach to an adopted baby, wishes for illicit sex, shyness).

LIFE-HISTORY ANALYSIS
AND PSYCHIATRIC EVALUATION

Behavioral ecologists have developed sophisticated methods of analyzing "life histories" based on the adaptive significance

of behavior patterns in different life stages and different environments (Krebs and Davies 1989). For instance, the death of salmon after spawning is not an accident, but the best strategy for maximizing the number of offspring. Those salmon that reserve resources to go back out to sea are so unlikely to make it back to the spawning grounds again that they end up (on average) having fewer offspring than those that exhaust all their resources in a single reproductive effort.

The concepts developed by behavioral ecology should be useful for human psychology. The conflicts faced by a single woman in her late thirties, for instance, can be conceptualized as difficult choices between career success without having children, versus having children with a partner who might be less than ideal while sacrificing financial status and independence. The main alternatives available to a young girl from a ghetto may be a poorly paid, boring job, a marriage to someone who will likely leave her or be unable to support her, or association with wealthy but dangerous men such as drug dealers. Many other dilemmas are characteristic of certain life situations: men who have families but are attracted to younger women, married women who become successful and find they are courted by wealthy men, parents who must split their investments between their children and their aging parents, teenagers who must choose between social and academic success. Such conflicts, especially those between parents and children and between spouses, can be interpreted in a life-history framework.

An evolutionary psychiatrist approaches a problem by systematic analysis of the patient's goals, strategies, and resources (tangible, personal, social, and kin). From this perspective, a "life crisis" can often be understood as a situation in which a threat to current adaptation is looming, or in which a current strategy is not working and must be changed. Such an evolutionary approach to psychiatry deemphasizes the explanation of psychopathology in terms of the individual's personality idiosyncrasies, and instead focuses attention on his or her current life situation, dilemmas, and coping strategies.

Standards of Evidence

Sociobiology is still in an early stage of development, which partly explains why it has so little influenced psychiatry. There

is much disagreement about how hypotheses are best formulated and even about what are legitimate and illegitimate objects of explanation. There is disagreement also as to what evidence most powerfully tests evolutionary hypotheses. At this early stage, it is not surprising that even among psychiatrists who appreciate sociobiology there has been an appeal for stricter standards of evidence (Lane and Luchins 1988).

It is tempting to hope that we just need to be more careful and explicit about our hypotheses and to gather more data to test them, but I doubt that this will prove sufficient. As Donald Symons (1987) has pointed out, as long as we lack agreement on fundamental conceptual issues, continued arguments about theory and general problems in the field will be a painful and tedious stage that we cannot bypass. As consensus emerges from the current debates, evolutionary psychobiology should begin to make incremental progress in which advance builds on advance to build a coherent whole.

Conclusion

A quarter of a century ago, the recognition of kin selection (Hamilton 1964) and the demise of group selection as a theoretical emphasis in evolutionary biology (Williams 1966) initiated a revolution in our understanding of behavior. Over a decade ago, these advances were applied systematically to animal behavior and social structures (Wilson 1975, Alcock 1984), and the implications for human psychology were recognized (Wilson 1978, Alexander 1979, Konner 1982). But psychiatry is still just beginning to change.

Why has psychiatry been so slow to incorporate the advances of evolutionary psychobiology? Conceptual and historical issues both appear to be responsible. The first conceptual difficulty is that evolution offers insights mainly about adaptation, while psychiatry's concern with pathology seems, at first glance, to be quite different. Second, by trying to understand the functions of traits, evolutionary psychobiologists undertake an enterprise that is viewed with suspicion by those who are unaware of advances in basic biology (Mayr 1988) and especially by those who believe psychiatry should disassociate itself from all but the "hardest" sciences. Third, the research methods of evolutionary psychobiologists lack specificity and elegance, and firm findings are few.

Historical and political factors also offer important explanations. Sociobiology has arisen at the very moment when its insights are least welcome in psychiatry. Just as psychiatrists are returning to their medical identities and searching for the physical causes of diseases, sociobiology suggests that many psychiatric disorders may not be diseases at all. Just as psychiatry has gained the capacity to relate various aspects of brain function to mental disorders, sociobiology suggests that brain abnormalities may be unrelated to the etiology of many psychiatric disorders. Just as research funding has become available for physiological research, sociobiology suggests that we need to understand the adaptive functions of psychological mechanisms. It is really not surprising that psychiatry has been largely unreceptive to sociobiology.

How much acceptance has there been? J. A. Talbott's 1989 book, *Future Directions for Psychiatry*, which surveys leading authorities about the future of psychiatry makes no mention of sociobiology or even evolution. Nevertheless, there are many hopeful signs. A chapter on sociobiology (Barash and Lipton 1985) was published in the widely respected *Comprehensive Textbook of Psychiatry*, and the newest edition of this text has a chapter on Anthropology based on evolutionary principles (Konner 1989). B. Wenegrat's promising overview of evolutionary psychiatry published in 1989, has now been completely reworked (Wenegrat 1990), and several similar works are in preparation. A 1987 conference on evolutionary psychology and psychiatry at the University of Michigan drew 150 participants (Low and Nesse 1989), and several symposia and a course were devoted to evolutionary psychiatry at the 1990 meeting of the American Psychiatric Association. There now seems to be a critical mass of psychiatrists applying evolutionary psychobiology to problems of psychopathology, and enthusiasm for their work is rapidly growing, especially among young psychiatrists, many of whom learned the fundamentals of sociobiology in college and who expect that psychiatry will be based on this foundation.

The first practical consequences of this change will be seen, I would guess, in the consulting room, at the step where the clinician assesses and tries to conceptualize the patient's

problem. Currently, clinicians try to integrate psychodynamics, learning factors, life situations, personality, and organic factors to understand how an individual has come to have a particular problem. The task is daunting, and the temptation is always to simplify by considering only one or two kinds of causes. But clinicians keep being forced, by clinical necessity, to try to find a way to make a coherent fabric from this mixed bag of yarn. The theory of evolution offers a well-tested loom.

The goal of such integration is widely accepted in psychiatry and has been the subject of innumerable publications. The vast majority of these either advocate an eclectic view of psychopathology that incorporates perspectives from various schools, or else propose some specific scientific framework such as systems theory or process theory. But eclecticism cannot integrate psychiatry, and no new theory is needed. As the editors of a conference on evolution and behavior said over **30** years ago:

It is so universally accepted as not to need explicit statement that the theory of morphology is evolution, with its various concomitants such as homology, analogy, adaptive radiation and progression and so on. It should by now be equally obvious that there is, indeed, a general theory of behavior and that theory is again, evolution, to just the same extent and in almost the same ways in which evolution is the general theory of morphology. (Roe and Simpson 1958)

May this perspective soon come to psychiatry.