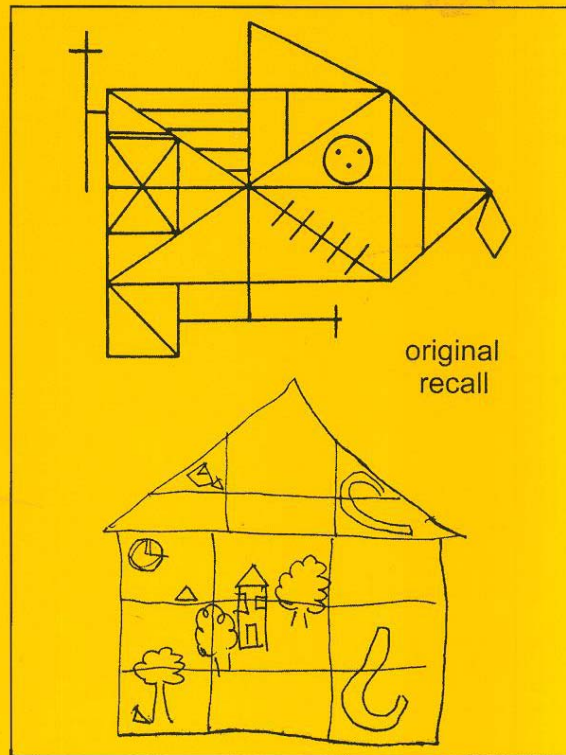


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Editors
Edward Nersessian
Mark Solms

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More generally, the psychological structuring of affect states, following Krause (1997, 1998), reflects the double function of affects as self-reflective assessment of the momentary organismic state, and as communication to the caregiver of the need or desire derived from that organismic state. The subject's cognitive assessment of the caregiver's affective reaction enters as a component of the affective memory of this particular self and object interaction. Thus, the subjective experience of affects always includes cognitive, self, and object representations. This theory would fit naturally with Panksepp's approach to affect activation. Psychoanalytic findings point to early dissociative mechanisms that tend to foster separate affective memory buildup for highly pleasurable or rewarding, peak affect states, in contrast to highly aversive, rageful, "persecutory" affect states. The concept of the eventual integration of these mutually split-off affect states as part of the cognitive integration of the concept of self and of significant others may provide an important complementary theory, that links neurobiological determination of affect activation with psychosocial functions of affects in the human being.

For the psychoanalyst, the clinical psychologist, the psychiatrist, and the research scientist involved in the study of normal and pathological affect activation, this is an outstanding text. Each chapter starts from the fundamentals and proceeds into a complex synthesis of contemporary findings and formulations regarding the dominant affect systems of the mammal species, particularly the primates and the human being. Panksepp ventures personal views in controversial areas, always differentiating actual knowledge from tentative hypotheses, and thus stimulates the reader to engage this rich volume in a critical and self-reflective way. With this book, he has done the field and all those concerned with its many challenges a great service.

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Otto F. Kernberg, M.D.
 21 Bloomingdale Road
 White Plains, NY 10605

Affective Neuroscience: The Foundations of Human and Animal Emotions, by Jaak Panksepp. New York: Oxford University Press, 1998, 466 pp., \$80.00.

For the psychoanalyst who is curious about what is going on in the brain that underlies the subjective dynamics we work with, Jaak Panksepp's *Affective Neuroscience* sounds instantly interesting, of course. For the analyst who finds neuroscience incomprehensible or irrelevant, however, this book is equally worth opening for several reasons. It provides a tremendously reader-friendly introduction to the brain; it focuses on something that makes sense to an analyst, the emotions; and it offers data on practically every page which, in exhilarating ways, supports, complements, or challenges central aspects of psychoanalytic thought.

In the preceding pages Dr. Kernberg has presented a thorough overview of *Affective Neuroscience*, so this review will focus on several aspects of Panksepp's central premise—that emotions are hard-wired—which relate to psychoanalysis. I will not expand on the other themes in this important book, but the reader should know that Panksepp offers data on a number of other aspects of emotion of central interest to psychoanalysis. He describes how the emotional circuits are relatively "open" systems that are highly influenced by experience, and how emotional systems interact with each other; he argues that emotions play a central role in consciousness; and he presents a model for the neurobiological seat of the self.

One of the most exciting aspects of this book is the sheer weight of evidence, eloquently explicated by Panksepp, that emotions are hard-wired. The basic emotions which have so far been studied have discrete circuitries and neurochemistries, although they overlap and interpenetrate in many cases. These basic emotional systems as delineated by Panksepp are the SEEKING, FEAR, RAGE, CARE, PANIC (separation distress), LUST, and PLAY systems. (Panksepp capitalizes the terms to indicate that he is using these terms scientifically to delineate specific neural systems, although I find it easy to hold onto the scientific specificity of the terms without capitalizing them and will use the terms in lower case.) His criteria for defining an emotional system is whether "a coherent emotional response pattern can be activated by localized electrical or chemical stimulation along specific brain circuits, and whether such arousal has affective consequences as measured by consistent approach or avoidance responses. Such constraints prevent the

analysis from getting more complex than the existing neuroscience evidence" (p. 14).

After reading the chapters on each emotional system, one gets a fascinating picture of how thoroughly ingrained, specific, physical and predetermined our core emotional responses are. Any doubts that this might not be the case are erased when reading about experiments in which, for example, stimulation of the seeking circuitry causes animals to move forth and explore their environments vigorously. Weak stimulation of the fear circuitry, on the other hand, promotes freezing, while heavy stimulation provokes the animal to flee. Stimulation of the separation distress circuit causes young animals to emit distress vocalizations or to seek out social contact. In each chapter, Panksepp elaborates on what is known about the behavior associated with each emotion, the brain circuits underlying the affect, and the specific neurochemicals which modulate it.

Panksepp argues that the wiring of emotional systems has two main functions: first, to help the organism manage various challenges in its environment by creating states of readiness for appropriate actions, and second, to help the organism learn from experience so it can navigate future situations more successfully. Panksepp describes emotions as "simple value-coding mechanisms that provide self-referential salience, thereby allowing organisms to categorize world events efficiently so as to control future behaviors" (p. 14).

The second function (the role of emotions in learning) is easily assimilated within a psychoanalytic viewpoint, as we have abundant clinical evidence that emotional reactions to events lead to associations that shape future behavior and experience. Indeed, Panksepp's assertion that emotions help us to learn from experience and negotiate future situations more successfully lends neurobiological support to our attempts to keep compassion in mind when thinking about defenses: from this perspective, defenses (as well as a variety of dysfunctions) can be seen as adaptations to the environment which ultimately have a libidinal aim—an attempt to preserve one's own survival and one's attachment to significant others.

The first function, that of creating states of readiness to negotiate current situations, presents the necessity of revisiting a number of important questions in psychoanalytic thought. The fact that humans are born with hard-wired programming to respond to specific stimuli in specific ways, which Panksepp's evidence demonstrates beyond question, in my opinion, means that the core aspects of basic emotional reactions are

not learned. The most dramatic example in the book is the fact that rats exhibit a marked fear response to the smell of cat hair, even though typical laboratory rats have never had any contact with cats! This leads us to reconsider the psychoanalytic approaches to a number of dynamics. Take attachment, for example: Panksepp's data on attachment and separation distress indicates that we do not form attachments to caregivers because they provide food, but because we have intrinsic needs for companionship and social care beyond simple food and warmth. This model supports current developmental and object relations theories of attachment, and challenges the classical version of anacletic attachment. Similarly, anxiety seems not to result from the birth experience, but because certain kinds of stimulus unconditionally trigger fear responses.

Panksepp's discussion of anger and aggression also provides the basis for further psychoanalytic consideration. The evidence clearly indicates that there are at least three different kinds of aggression: predatory aggression (or "quiet-biting attack"), intermale aggression, and affective attack ("defensive attack" or rage). Affective attack behaviorally looks like what we call anger, with animals hissing and growling during their attack, whereas quiet-biting attack entails "methodical stalking and well-directed pouncing" (p. 194). These two states are linked to different brain structures: quiet-biting attack is elicited by stimulating the dorsolateral hypothalamus, and affective attack by the ventrolateral and medial hypothalamus. However, these two forms of aggression are not absolutely disconnected—predatory aggression has extensive overlap with the seeking system, and rage is mainly provoked by frustration, which is hypothesized to result from the neurodynamics of the arousal of the seeking system in the presence of a possible reward, followed by its rapid suppression in the absence of the homeostatic indicators of the achievement of the award. Taking this data into account, then, gives us some food for thought about psychoanalytic debates about aggression—namely, whether it is a drive, or a reaction to frustration. What is interesting about the neurobiological distinction between anger and predatory aggression is that the answer could be some version of "both"—but it means then that in the psychoanalytic debate we have been talking about two kinds of aggression as if they were one. The aggression that arises from the seeking system would seem to have the status of drive, but the destructive aggression that is a response to frustration would seem not to be a drive.

Panksepp's highlighting of emotion's role in creating states of readiness for action adds an important dimension to our thinking about emotion, which is that emotion is at least as much, if not more importantly, a motor dynamic rather than a sensory one. In other words, emotions are not just something we passively feel, but rather are active responses to the environment that are predominantly designed to get us to *do* something in order to navigate the world successfully. This perhaps speaks to one of the central therapeutic actions of psychoanalysis, which is that the resolution of conflicts allows us to respond more efficiently to the world, letting our emotions guide our actions in the ways they are designed to do—to get us away from dangerous situations (fear), actively remove obstacles or defend ourselves (anger), explore the world with interest or compete for resources (seeking), form and maintain nurturing connections with other creatures (attachment), repair bonds when they are disrupted (separation distress), pursue objects of sexual interest and put energy into maintaining satisfying relationships (lust), and create opportunities to feed our need to play (play). One could perhaps create a taxonomy of the pathologies treated by psychoanalysis just by looking at the various ways in which each of these systems have become individually distorted or dysfunctionally related to the others.

The focus on the brain structures which underlie affect strongly supports a distinction between emotion and cognition. Panksepp notes that:

[T]o the best of our knowledge, the affective essence of emotionality is subcortically and precognitively organized [and furthermore that although] cognitive and affective processes can be independently conceptualized, it comes as no surprise that emotions powerfully modify cortical appraisal and memory processes and vice versa. The innate emotional systems interact with higher brain systems so extensively that in the normal animal there is probably no emotional state that is free of cognitive ramifications [although it is possible that in humans there are some cognitions that are free of affect] [p. 26].

He goes on to state that

[T]he emotional systems are centrally placed to coordinate many higher and lower brain activities, and each emotional system also interacts with many other nearby emotional systems. Because of the ascending interactions with higher brain areas, there is no emotion without a thought, and many thoughts can evoke

emotions. Because of the lower interactions, there is no emotion without a physiological or behavioral consequence, and many of the resulting bodily changes can also regulate the tone of emotional systems in a feedback manner [p. 27].

The distinction between emotion and cognition is important for several reasons. It offers neurobiological support for the distinctions that analysts make in practice when they encourage patients to differentiate between thoughts and feelings, and to observe how one's affects can color one's thinking and vice versa. The distinction in the brain also seems to underlie the experiential distinction we make between "being in our heads" and feeling something "in our hearts." It also helps to clarify what is going on when a person with some kind of affective disorder, like depression or mania, for example, is also having trouble with their thinking. In reverse order, too, the fact that cognitions have emotional effects goes a long way toward explaining one of the main dynamics of psychopathology in general, particularly the neuroses: We are the only species, presumably, whose symbolic capacities allow us to represent situations to ourselves that are not happening, and thereby trigger emotional responses that are not related to our current external environments. Normally organisms only feel fear when presented with a fearful stimulus, or stimulus that has become associated with fearful stimulus. We, however, can continue to have ideas, both conscious and (more importantly) unconscious, which can chronically trigger responses such as fear, separation, distress, or anger. The therapeutic action of psychodynamic treatment involves making these ideas conscious and working through the internal structures that continue to generate those ideas.

Unfortunately for the eager and curious reader, in this book Panksepp cannot offer much in the way of explaining why emotions *feel* the way that they do. For example, what is it about the activation of the anger circuitry and the associated neuropeptides that makes an organism feel like striking out? What about the unpleasant aspect of anger feels unpleasant? Why does separation induce a feeling of emptiness in the stomach or an ache in the heart? How exactly does the deficit of dopamine give depression the feeling of sluggishness, or its abundance get translated into the subjective experience of feeling energized? As Panksepp says, it is "an understatement to say that at present we do not know how, precisely, affective states are generated within the brain" (p. 26). He acknowledges that the current task of affective neuroscience

is to specify the specific brain circuits underlying emotion, and that an "additional and even more difficult task is to unravel how emotional feelings emerge from the neurodynamics of many interacting brain systems" (p. 17), thereby acknowledging that this level of investigation has barely passed the embryonic stage. Panksepp's work as summarized in this book, together with Antonio Damasio's recent work, goes quite a distance in delineating how the activation of the visceral and motor circuits associated with the basic emotions results in bodily changes which are experienced as the lumps in the throat or the urges to strike out, although the fundamental, and perhaps impossible, questions of why pain feels bad and pleasure feels good are still not completely answered. Even though the data are incomplete, however, one wishes that Panksepp, obviously both an intuitively gifted and encyclopedically informed investigator, had offered more speculations about the matter.

This book lends critical support to psychoanalysis as a practice, because it illustrates clearly how the environment impacts a person's nervous system. The data show that social interactions have a neurological-psychological impact that is incontrovertible. In other words, after reading this work, one can't say anymore that something is "just in your head," as if emotional activity is divorced from a physical, neurological reality. If nothing else, Panksepp's work shows that we are designed to be exquisitely responsive to social interactions, to develop attachments to others, and that this biological design has been central in our survival and success as a species. We can't get away from the fact that how others treat us, and how we view ourselves in relation to significant others, has a deep and central effect on our entire functioning.

However, since the evidence is so clear that the emotional circuitry is affected by social stimulus—more emphatically, that it is *designed* to be attuned to social stimulus above all else—it is really surprising how often Panksepp's discussion ends up by pointing primarily to chemical interventions to address various emotional difficulties, including eating disorders, depression, and autism. For example, bulimia has been associated with excess levels of neuropeptide Y (NPY), a neuropeptide which increases feeding activity (p. 181). Panksepp notes that pharmacological interventions such as an NPY antagonist might yield new medications to control appetite (if appetite, strictly defined, is even the driving force in bulimia). Certainly there is no argument whatsoever that at the serious ends of the spectrum of any affective disorder, chemical intervention is important. However,

what is missing from his discussion is an equal focus on addressing disorders by modifying the social input the person's nervous system is getting—so to take the example above, in addition to a neuropeptide antagonist, we could also look at what socioemotional or other environmental influences might cause high levels of NPY. If emotions are responses to social stimulus, and second, if the brain is the unbelievably complex organ that we know it is, which makes chemical interventions challenging (because of issues of the blood-brain barrier, complex and poorly understood interactions between neurochemicals, and the different actions of neurochemicals in different locations in the brain, among other variables) it seems reasonable to suggest that a critical element in responding to any affective difficulty is to focus on socioemotional inputs.

It should be noted that Panksepp has written this book with several audiences in mind, and as such it participates concurrently in several different agendas. In addition to being a primary textbook introducing readers to the brain science of emotions, *Affective Neuroscience* is also a strong argument directed toward fellow neuroscientists to induce them to take emotion seriously as an object of empirical study. There are also threads woven throughout the book that contribute to ongoing debates about the function of emotions, the distinction between emotion and motivation, the necessity of animal research, and the validity of applying animal research to human models. The recurrence of these various threads could leave a nonneuroscientific reader feeling a little buffeted or puzzled by certain digressions. However, this is mitigated when one remembers that the book is not simply a textbook laying out the current stage of knowledge, but is also a contribution to a discussion about the more unsettled issues in the field.

Two final issues which deserve significant further exploration will just be briefly noted to stimulate the reader's seeking system. The first arises from the function of emotions as homeostatic indicators. Emotions serve to indicate one's internal need state and monitor the extent to which the environment is supporting or threatening one's ability to get those needs met. This is interesting because to a certain extent one could say, based on Panksepp's data, that we feel the need for attachment, for example, in a similar way that we feel hunger or thirst. The significance for psychoanalysis is the implication that social and emotional needs (such as the need for attachment or play) are truly *biological* needs and should therefore not be relegated to the bottom of the ladder either in scientific research

or in our society (reflected, for example, in hostility toward psychodynamic treatment, particularly long-term treatment). The second issue is related to the first, which is that Panksepp shows how each emotional circuit terminates in the periaqueductal gray (PAG) part of the brainstem, which he proposes as the foundational structure underlying one's primordial self-schema or SELF (which he defines as a "Simple Ego-type Life Form"). He suggests that emotional feelings "may arise from the ways in which the basic emotional command circuits modulate neuronal reverberations or resonances within [the] extended representations of the SELF" which arise at higher levels of the brain (p. 310). While much could be said about Panksepp's proposal, I would like to point to the model's implications for understanding affective disorders. As most of us know from personal or clinical experience, an affective disturbance does not simply complicate one's life—it can color, in a very global way, how one feels about one's self and the world. If the emotional circuits play a primary role in the operation of this primordial self representation, the global nature of an affective state, then, is not so surprising anymore. Indeed, if the model is accurate, it seems that our emotional circuits color the overall feel of what it

is *like* to be a conscious being, and, moreover, whether the experience of being conscious feels like something one must simply survive, in a hostile and gray universe, or whether it is an inherently pleasurable experience in which one has the energy to go out in the world, with an expectation that one's needs can be fulfilled.

Dr. Panksepp notes in his Preface that "this book is written especially for those students who wish to bridge psychological and neurological issues in scientifically sound ways. For them, I have attempted to mill the abundant factual peppercorns into tempting conceptual spices" (p. ix). Not only does this phrase indicate the skill with which *Affective Neuroscience* is written, but clearly articulates the reason why all readers interested in the neuroscience of emotions should pick it up.

Maggie Zellner
853 Broadway, Suite 1501
New York, NY 10003
e-mail: magsterz@aol.com

Editors' note: See Ongoing Discussion (Vol. 3, No. 1) for some reflections by Paul MacLean, one of the great pioneers of affective neuroscience, stimulated by Jaak Panksepp's book.