Jaak Panksepp - selected references

1 Panksepp, J. & Panksepp, J. B. (2013). Toward a cross-species understanding of empathy. *Trends in Neurosciences, 36,* 489-496.
Notes: Although signs of empathy have now been well documented in non-human primates, only during the past few years have systematic observations suggested that a primal form of empathy exists in rodents. Thus, the study of empathy in animals has started in earnest. Here we review recent studies indicating that rodents are able to share states of fear, and highlight how affective neuroscience approaches to the study of primary-process emotional systems can help to delineate how primal empathy is constituted in mammalian brains. Cross-species evolutionary approaches to understanding the neural circuitry of emotional 'contagion' or 'resonance' between nearby animals, together with the underlying neurochemistries, may help to clarify the origins of human empathy
Department of Integrative Physiology and Neuroscience, College of Veterinary Medicine, Washington State University, Pullman, WA 99164-6520, USA. Electronic address: jpanksepp@vetmed.wsu.edu

2 Panksepp, J. (2011). The basic emotional circuits of mammalian brains: do animals have affective lives? *Neuroscience and Biobehavioral Reviews, 35,* 1791-1804.
Notes: The primal affects are intrinsic brain value systems that unconditionally and automatically inform animals how they are faring in survival. They serve an essential function in emotional learning. The positive affects index "comfort zones" that support survival, while negative affects inform animals of circumstances that may impair survival. Affective feelings come in several varieties, including sensory, homeostatic, and emotional (which I focus on here). Primary-process emotional feelings arise from ancient caudal and medial subcortical regions, and were among the first subjective experiences to exist on the face of the earth. Without them, higher forms of conscious "awareness" may not have emerged in primate brain evolution. Because of homologous "instinctual" neural infrastructures, we can utilize animal brain research to reveal the nature of primary-process human affects. Since all vertebrates appear to have some capacity for primal affective feelings, the implications for animal-welfare and how we ethically treat other animals are vast

3 Northoff, G., Wiebking, C., Feinberg, T., & Panksepp, J. (2011). The 'resting-state hypothesis' of major depressive disorder-A translational subcortical-cortical framework for a system disorder. *Neuroscience and Biobehavioral Reviews, 35,* 1929-1945.
Notes: Major depressive disorder (MDD) has traditionally been characterized by various psychological symptoms, involvement of diverse functional systems (e.g., somatic, affect, cognition, reward, etc.), and with progress in neuroscience, an increasing number of brain regions. This has led to the general assumption that MDD is a stress-responsive brain 'system disorder'

where either one or several alterations infiltrate a large number of functional systems in the brain that control the organism's somatic, affective, and cognitive life. However, while the effects or consequences of the abnormal changes in the functional systems of, for instance affect, cognition or reward have been investigated extensively, the underlying core mechanism(s) underlying MDD remain unknown. Hypotheses are proliferating rapidly, though. Based on recent findings, we will entertain an abnormality in the resting-state activity in MDD to be a core feature. Based on both animal and human data, we hypothesize that abnormal resting-state activity levels may impact stimulus-induced neural activity in medially situated core systems for self-representation as well as external stimulus (especially stress, specifically separation distress) interactions. Moreover, due to nested hierarchy between subcortical and cortical regions, we assume 'highjacking' of higher cortical affective and cognitive functions by lower subcortical primary-process emotional systems. This may account for the predominance of negative affect in somatic and cognitive functional system operations with the consecutive generation of the diverse symptoms in MDD. We will here focus on the neuroanatomical and biochemical basis of resting-state abnormalities in MDD including their linkage to the diverse psychopathological symptoms in depression. However, our 'resting-state hypothesis' may go well beyond that by being sufficiently precise to be linked to genetic, social, immunological, and endocrine dimensions and hypotheses as well as to clinical dimensions like endophenotypes and various diagnostic-prognostic biomarkers. Taken together, our 'resting-state hypothesis' may be considered a first tentative framework for MDD that integrates translational data, the various dimensions, and subcortical-cortical systems while at the same time providing the link to the clinical level of symptoms, endophenotypes and biomarkers

4 Panksepp, J. (2010). Affective neuroscience of the emotional BrainMind: evolutionary perspectives and implications for understanding depression. *Dialogues.Clin.Neurosci., 12,* 533-545.
Notes: Cross-species affective neuroscience studies confirm that primary-process emotional feelings are organized within primitive subcortical regions of the brain that are anatomically, neurochemically, and functionally homologous in all mammals that have been studied. Emotional feelings (affects) are intrinsic values that inform animals how they are faring in the quest to survive. The various positive affects indicate that animals are returning to "comfort zones" that support survival, and negative affects reflect "discomfort zones" that indicate that animals are in situations that may impair survival. They are ancestral tools for living--evolutionary memories of such importance that they were coded into the genome in rough form (as primary brain processes), which are refined by basic learning mechanisms (secondary processes) as well as by higher-order cognitions/thoughts (tertiary processes). To understand why depression feels horrible, we must fathom the affective infrastructure of the mammalian brain. Advances in our understanding of the nature of primary-process emotional affects can promote the development of better

preclinical models of psychiatric disorders and thereby also allow clinicians new and useful ways to understand the foundational aspects of their clients' problems. These networks are of clear importance for understanding psychiatric disorders and advancing psychiatric practice

5 Northoff, G. & Panksepp, J. (2008). The trans-species concept of self and the subcortical-cortical midline system. *Trends in Cognitive Sciences, 12,* 259-264.
Notes: DA - 20080630
The nature of the self has been one of the central problems in philosophy and most recently in neuroscience. Here, we suggest that animals and humans share a 'core self' represented in homologous underlying neural networks. We argue that the core self might be constituted by an integrative neuronal mechanism that enables self-related processing (SRP). Because mammalian organisms are capable of relating bodily states, intrinsic brain states (e.g. basic attentional, emotional and motivational systems) and environmental stimuli to various life-supporting goal-orientations, SRP appears to be a core ability preserved across numerous species. Recent data suggest that SRP is operating via a central integrative neural system made up of subcortical-cortical midline structures (SCMSs), that are homologous across mammalian species

6 Panksepp, J. (2005). Affective consciousness: Core emotional feelings in animals and humans. *Consciousness and Cognition, 14,* 30-80.
Notes: Department of Psychology, Bowling Green State University, Bowling Green, OH 43403, USA. jpankse@bgnet.bgsu.ed
The position advanced in this paper is that the bedrock of emotional feelings is contained within the evolved emotional action apparatus of mammalian brains. This dual-aspect monism approach to brain-mind functions, which asserts that emotional feelings may reflect the neurodynamics of brain systems that generate instinctual emotional behaviors, saves us from various conceptual conundrums. In coarse form, primary process affective consciousness seems to be fundamentally an unconditional "gift of nature" rather than an acquired skill, even though those systems facilitate skill acquisition via various felt reinforcements. Affective consciousness, being a comparatively intrinsic function of the brain, shared homologously by all mammalian species, should be the easiest variant of consciousness to study in animals. This is not to deny that some secondary processes (e.g., awareness of feelings in the generation of behavioral choices) cannot be evaluated in animals with sufficiently clever behavioral learning procedures, as with place-preference procedures and the analysis of changes in learned behaviors after one has induced re-valuation of incentives. Rather, the claim is that a direct neuroscientific study of primary process emotional/affective states is best achieved through the study of the intrinsic ("instinctual"), albeit experientially refined, emotional action tendencies of other animals. In this view, core emotional feelings may reflect the neurodynamic attractor landscapes of a variety of extended trans-diencephalic, limbic emotional action systems-including SEEKING, FEAR, RAGE, LUST, CARE, PANIC, and PLAY. Through a study of these brain systems, the neural

infrastructure of human and animal affective consciousness may be revealed. Emotional feelings are instantiated in large-scale neurodynamics that can be most effectively monitored via the ethological analysis of emotional action tendencies and the accompanying brain neurochemical/electrical changes. The intrinsic coherence of such emotional responses is demonstrated by the fact that they can be provoked by electrical and chemical stimulation of specific brain zones-effects that are affectively laden. For substantive progress in this emerging research arena, animal brain researchers need to discuss affective brain functions more openly. Secondary awareness processes, because of their more conditional, contextually situated nature, are more difficult to understand in any neuroscientific detail. In other words, the information-processing brain functions, critical for cognitive consciousness, are harder to study in other animals than the more homologous emotional/motivational affective state functions of the brain

7 Panksepp, J. (2002). Foreword: The MacLean legacy and some modern trends in emotion research. In G.A.Cory & R. Gardner (Eds.), *The evolutionary neurobiology of Paul MacLean. Convergences and frontiers* (pp. IV-XXVII). Westport,CT: Praeger.
Notes: (Angry criticism of "neurobehaviorist" and "molecular" critics (e.g. J.LeDoux) of Maclean's concept of the limbic system, and defense of a holistic approach to emotions including studies and theories of experienced emotional states)

8 Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. (1 ed.) New York: Oxford University Press.
Notes: 466pp; 16 chapters in 3 parts: 1. Conceptual background. 2. Basic emotional and motivational processes. 3. The social emotions

9 Panksepp, J. (1982). Toward a general psychobiological theory of emotions. *Behavioral and Brain Sciences, 5,* 407-467.