

Evolving brains, evolving minds

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Kluge, i. e. “a clumsy or inelegant – yet surprisingly effective solution – to a problem.” In this way Marcus (2008) has termed human brain, as a product of evolution, because of the coexistence in it of ancient phylogenetic structures with new ones. MacLean (1990) described primate’s brain as formed by three principal phylogenetic structures that have been integrated during evolution. He called these basic types Protoreptilian (R-complex), Old mammalian (Limbic System), and Neomammalian brains.

The heuristic value of this model, for a long time underappreciated, has been revalued by many scholars (Cory & Gardner 2002). The counterpart of the Protoreptilian brain in Mammals is fundamental for genetically constituted forms of behavior as hunting, mating, and forming social hierarchies. The Limbic System is the main seat of emotive behaviors, and it may also be seen as a regulator (mostly inhibitory) of the R-complex, while the Neomammalian brain is the main seat of cognitive and conscious capabilities. Considering the global functioning of the Brain (i. e. the Mind), d’Aquili and Newberg (1999) have considered its primary functional components, which they have referred to as cognitive operators, which have specific functions that are localized in specific regions of the brain and perform activities that underlie the capacities of the mind. Newberg and d’Aquili (2001) have described eight cognitive operators: the holistic, the reductionist, the causal, the abstractive, the binary, the quantitative, the emotional, and the existential ones. As these authors noticed (2001), the cognitive operator concept is clearly “similar to the concept of cognitive modules in that both are functions and are localizable to one or more specific areas of the brain.” ... However, cognitive operators differ from cognitive modules, because cognitive modules represent more specific functions that are localized to particular brain structures, whereas cognitive operators refer to more generalized functions of many areas of the brain: modules are concerned more the anatomy of the brain, operators more the physiology of the brain (or of the encephalon). However brain functions also produce behaviors and unconscious knowledge.

In this paper we extend the operator concept from cognitive ones to encephalic ones. Encephalic operators may be defined as behavioral, emotive or cognitive operators that are specific functions performed by specific parts of the encephalon. In this paper we sketch the distribution of encephalic operators among brain structures and in a phylogenetic view, also comparing these operators with Primary Emotional Systems identified by Panksepp (1998).

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