

### Supernatural agents in human minds: brain mechanisms and triggering stimuli

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According to Darwinian Evolution, all human behaviors or thoughts are products of neural (or neuroendocrine) functions in conjunction with inputs that trigger these functions: No function, no behavior or thought; no input, no behavior or thought (adapted from Buss & Shackelford 1997).

Most scholars think that religion, in the basic form we here consider, i. e. belief in supernatural agents, arose, in early humans, from the functions of cognitive “devices” such as the Hyperactive Agent Detection Device (HADD, Barrett, 2000), and the Hyperactive Understanding of Intentionality (HUI) and the Hyperactive Teleofunctional Reasoning (HTR) ones (Pysiäinen, 2009).

Dunbar (2004) has pointed up that if religion needs a fifth level of intentionality and a grammatical language it could arise only in anatomically modern humans (less than 200,000 years ago), and Rossano (2010) suggests that religion arose in the “African Interregnum” (from 100,000 to 70,000 years ago). From an ethological point of view, religion is a system of rank, implying dependence, subordination and submission to unseen superiors (Burkert, 1996). About the genesis of the ideas of such beings, Morris (1967), updating Freud, has proposed that divine beings resulted from the projection of the figure of the dominant male of a “Single Male” primate group.

However, inferring social behaviour from the sexual dimorphism noticed in fossils, most scholars think that in ancient groups of *Hominini* endowed with low sexual dimorphism (as from *Homo habilis* or *Homo erectus* on), there was not any individual, i. e. dominant male of a SM group, that could act as realistic example of a “Immense Powerful Being/Agent”. How could a projection in a super-human world of such a being have happened? A possible answer is that the human brain preserved (and still preserves) hierarchy forming structures, but they were (up to pre-religious *Homo sapiens*) inhibited or not stimulated. Consequently we can deduce that at some time (presumably in the African Interregnum) hierarchy forming structures has been set free from the inhibitory action of other brain structures, or were triggered to act, as a consequence of a strong stimulus. As this stimulus gave rise to a concept of an unseen agent, it had to be a phenomenon with no empirical cause. We may presume that this “input” consisted in the awareness of being mortal: *Homo sapiens* realized he could die even if no visible agent killed him. In this paper we schematize how this input triggered the action of above mentioned brain “devices” to develop a “Immense Power Agent” concept, and then religions according to ecological, cultural and social environments.

**References:** Barrett, J., 2000. Exploring the natural foundations of religion. *Trends Cogn.Sci.* 4, 29-34. Burkert, W., 1996. *Creation of the Sacred*. Harvard University Press, Cambridge. Buss, D. M., Shackelford, T. K., 1997. Human Aggression in Evolutionary Psychological Perspective. *Clinical Psychology Review* 17, 605-619. Dunbar, R., 2004. *The Human Story*. Faber & Faber, London. Morris, D., 1967. *The Naked Ape*. J. Cape, London. Pysiäinen, I., 2009. *Supernatural Agents*. Oxford University Press, New York. Rossano, M., 2010. *Supernatural Selection*. Oxford University Press, New York.