

Recent researches revealed that music reduces the degree of chaos in brain waves. A.Loskutov, A.Hubler, and others carried out a series of studies concerning control of deterministic chaotic systems. It turned out, that carefully chosen tiny perturbation could stabilize any of unstable periodic orbits making up a strange attractor. V.Bondarenko shown in computer experiments a possibility to control a chaotic behavior in neural network by external periodic pulsed force or sinusoidal force. Low-dimensional outputs are observed when the frequency of the external force is close to delta-, theta-, alpha-, and beta frequencies. We suggest that music acts on the brain near these eigenfrequencies of self-excited oscillations in the neural network to suppress chaos. We explain the structure of music tonalities using concept of attractor network model. Three stable steps of tonality: tonic, median, and dominant are keynotes or attractors of neural network model. There are many reasons to believe that among four types of instinctive behaviors and four frequencies of the brain exists one-to one correspondence: delta rhythm – food behavior, theta – fear, alpha – sex, and beta – aggression. This hypothesis does not contradict with available empirical data.

Delta rhythm is the main rhythm for all newborns both animals and humans (infants up to one years of age). Undoubtedly, the food instinct is the main instinctive behavior for all newborns. Therefore, delta rhythm may be connected with the pleasure taken from food.

Theta rhythm one usually connects with waking behavior in different species which are pivotal to the animal's survival. For instance, it is predation for cats, exploration for rats, and apprehension for rabbits. Undoubtedly, the basic for all such kinds of pivotal behaviors is food behavior. There is never-ending conflict and tension between food searching and avoiding predators which is the strongest natural stressor that wild animals experience. Theta rhythm is also dominant rhythm for human infants by 13 years old.

We may suggest that all such kinds pivotal behaviors are accompanied by fear because namely during food searching and during childhood animals and humans are the least defended and protected from different threats outside. The source of theta oscillations is the hippocampus which has strong reciprocal connections with amygdala - the centre of fear emotion. Therefore the fear is the next in importance and the next in order instinctive behavior and it may be connected with alarm, threat, and fear feelings.

Completion of the alpha rhythm occurs at the puberty period. Children before 12-13 years old have rather weak alpha waves. Adult humans have maximal alpha rhythm when he or she is relaxing with close eyes. But relaxing state with closed eyes usually accompanies sexual enjoyment.

Beta rhythm is associated with focused attention toward external stimuli, alert mental activity with increasing muscle tension and raising blood pressure. We suppose that beta rhythm is connected with aggression.

This assumption is supported by A. Blood and R. Zatorre experiment that music involves the brain regions such as ventral stratum, midbrain, amygdala that are connected with such biologically relevant stimuli as food, sex and others.