

Epsilon, Gamma, HyperGamma, Lambda Brainwave Activity and Ecstatic States of Consciousness (article)

Dr. Jeffrey D. Thompson, D.C., B.F.A.

Brain mapping research studies into different brainwave patterns associated with different states of consciousness has been carried out in major centers throughout the country. The normal range of brainwave frequency activity in the cortex neurons has traditionally been from 0.5 Hz Delta to 30.0 Hz Beta. Most of the early brainwave research was concerned with sleep studies. From these studies, it became accepted brainwave nomenclature to associate Beta activity with externally directed linear thinking mental activity, Alpha activity with internally directed non-linear mental activity, Theta with dreaming sleep, emotional elements and experiences and Delta with the deepest and most physically restorative portion of sleep.

In non-sleeping states, these brainwave patterns are associated with various states of "waking" consciousness. High levels of Beta are associated with high levels of focus and concentration, Alpha is associated with inner mental "pondering," Theta with original, creative inspiration, problem solving, visualization and Delta with deep physical relaxation.

In meditation studies, Alpha brain states are associated with a typical "Zen" meditation, in which the attention is in a state of "open focus." In this state, one's attention is directed to everything simultaneously. Theta brain states are associated with out of body or astral forms of mediation. In these states, one usually experiences seeing the guru, experiencing places of beauty or peace, and sometimes receiving great spiritual insights with associated visions and sounds. These Theta states are also associated with the classic Shamanic "journeying" experiences. Delta mediation states are associated with being in the void or "white light" states. These states are timeless, formless and linked to states of suspended animation. Deep-level Yogic adepts can slow respiration and heart beat to be virtually undetectable.

Studies here at the Center for Neuroacoustic Research have shown clear and repeated evidence, in patients, of brainwave frequency patterns below the traditionally accepted lowest Delta rhythms of 0.5 Hz. This would be brainwave activity as slow as one quarter cycle per second, one frequency per 10 seconds, per one minute, or even longer. Indications of ultra-slow frequencies are evident on the EEG traces of certain patients experiencing extraordinary states of consciousness. These states seem to be associated with very high states of meditation, ecstatic states of consciousness, high-level inspiration states, spiritual insight and out-of-body experiences. Some of the higher Yogic states of suspended animation associated with deepest Delta brain states actually continue deeper into these below-Delta brainwave states, which we are calling the Epsilon State (Epsilon, since it is the next Greek letter of the alphabet after Delta).

In order to explore these deeper extraordinary states of consciousness associated with Epsilon brainwave patterns, we have had to use traditional EEG equipment in unique ways and to initiate the design of specialized EEG equipment to measure frequencies this slow. Most regular EEG equipment is not set up to measure frequencies below 0.5 Hz.

We have also noticed that whenever there are extraordinary meditation states present, brainwave electrical activity between the right/left hemispheres tends to synchronize. This synchronization of the cerebral hemispheres seems to only happen in special circumstances of consciousness - the "aha" state, the moment when the answer to a problem occurs, creative inspiration, great insight and moments of awareness of one's own existence.

There have also been reports in the EEG literature from other researchers, that there is evidence of extraordinary states of consciousness associated with higher-than-Beta brainwave activity. These brainwave patterns go from 40 Hz and above - in some cases, as high as 100 Hz or more. The 40 Hz higher-than-Beta activity is now an accepted brainwave state in EEG nomenclature being referred to as "Gamma" brainwaves. We are calling brainwave frequency patterns significantly higher than 40 Hz "Hyper-Gamma" brainwave states. More recently, there have been reports by EEG researchers of ecstatic states of consciousness associated with brainwave frequencies of 200 Hz, we are calling these frequencies "Lambda" brainwave states.

Early evidence of the 40 Hz EEG brain activity from the Neuroscience Unit at the University of Birmingham has shown these frequencies to be associated with higher levels of brain organization "binding" information from all the senses together for a higher-level awareness of unity of the objects of our perception. Gamma rhythms also seem to be associated exclusively with higher mental activity, including perception and consciousness. - since Gamma activity disappears with general anesthesia. There is also evidence that Gamma frequencies appearing in different areas of the cortex synchronize themselves together in a more holographic manner during these extraordinary states of consciousness associated with "Shamanic" and "Mystical" experience.

The states of consciousness that appear to be associated with HyperGamma brainwave activity (at 100 Hz) and Lambda brainwave activity (at 200 Hz) seem to be described in exactly the same terms as we have been describing our discovery of Epsilon (below 0.5 Hz) over the years. It has seemed extraordinary that different groups of EEG researchers, independent of one another, should find the same states of consciousness associated with such divergent brainwave activity - below 0.5 Hz Delta to above 100 Hz HyperGamma to 200 Hz Lambda.

There seems to be a circular link between these two extremes of brainwave activity and the states of consciousness, which they represent. They appear to be associated with the type of extraordinary states of consciousness we find in the highest states of meditation, deepest levels of insight, personal original creative problem solving and high degrees of Self-awareness. We have surmised that these extremely slow Epsilon brainwave patterns might have extremely fast HyperGamma/Lambda brainwave patterns modulating within them - just as the Hyper-Gamma/Lambda brainwave patterns are "riding" on a super slow Epsilon modulation.