

Research Title: The study About Brain Wave Extreme Low frequency and Works

Abstract –This purpose of this paper is to explore the technology used to map electromagnetic brain waves and the meaning of these waves. Using different type methods of Mapping of brain operations has become a critical issue in the medical field and electrical field. This field of study is known as neurophysiology. A newer method is placing nodes on the scalp to perform an EEG, MRI and ECG find different level of brain frequency and It's work. This method is using find different brain frequencies and works are using in medical point of view and advance technology or robotics applications.

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Keywords: *Electromagnetic, EEG, Neurophysiology*

Introduction

The brain produces waves of currents that flow throughout its neural pathways. The type of brainwave is defined by the frequency at which it is pulsing. The particular rate of pulsation determines your state of mind. There are often several patterns interacting at one time. Entrainment can be utilized to synchronize your brain to specific frequencies. Two tuning forks of the same pitch will both resonate at the same frequency when one is struck. Brains operate much like a resonance chamber, oscillating pulses and patterns of neural excitations ripple through our brains much like never-ending waves in a dynamic pond of subtle electrical matter. Brainwave entrainment and binaural beats occur naturally in our environment. We are learning more about how these states can be summoned and harnessed to create mindstates that are conducive to expanded states of consciousness. Great ideas occur during this time period. Einstein came up with the theory of relativity in this state, and likewise, one of the Watson and Crick pair visualized the double helix in this mindstate successfully cracking the illusive architecture of DNA. Brains have a left and a right hemisphere. The left hemisphere is linear, logical, practical, and time orientated. The right hemisphere is non-linear, abstract, creative, wholistic, and non-logical. Accountants use less of the right hemisphere than artists would. We use one hemisphere at a time, favoring a particular hemisphere depending on activities. For math you would use more of the left side. Painting a picture, you would use more right hemispheric activity. It's not that simple, since both hemispheres are constantly interacting and both can be in use at the same time [1,2].

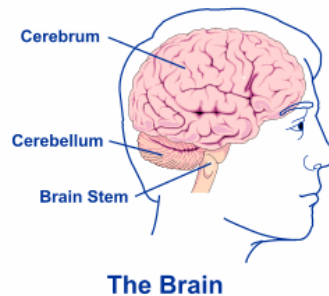


Fig. 1 the frequency generate in The Brain parts

These hemispheres are connected by the corpus callosum. It is a bridge between both sides. It can be exercised and strengthened until it is physically larger and more capable of transmitting data, thoughts and feedback between hemispheres. By merging both hemispheres and allowing them to work together you can increase mental fitness (like having a faster modem working at faster speeds). A more integrated system creates better performance. Edgar Cayce, a famous clairvoyant healer was found to have an unusually large corpus callosum. The brain is an electrochemical organ; and speculations are that a fully functioning brain can generate as much as 10 watts of electrical power. More conservative investigators calculated that if all 10 billion interconnected nerve cells discharged at one time that a single electrode placed on the human scalp would record 5 millionths to 50 millionths of a volt. Electrical activity emanating from the brain is displayed in brainwaves. When the brain is aroused and

actively engaged in mental activities, it generates beta waves. These beta waves are of relatively low amplitude, and are the fastest of the four different brainwaves. Beta waves are characteristics of a strongly engaged mind or active conversation [2]. Where beta represented arousal, alpha represents non-arousal. Alpha brainwaves are slower and higher in amplitude. A person who sits down to rest, reflect or meditate is often in an alpha state [2,3]. **Theta brainwaves**, are even greater amplitude and slower frequency. A person who begins to daydream, who is driving on a freeway, and discovers that they can't recall the last five miles, is often in a theta state. Delta brainwaves are of the greatest amplitude and slowest frequency. Deep dreamless sleep is the lowest frequency. Humans dream in 90 minute cycles. When the delta brainwave frequencies increase into the frequency of theta brainwaves, active dreaming takes place. Rapid eye movement (REM) is characteristic of active dreaming. Although one brainwave state may predominate at any given time, depending on activity level, the remaining three brain states are present in the mix of brainwaves at all times. Knowledge of brainwave states enhances ability to make use of specialized characteristics of those states. (being intensely focused, relaxed, creative and in restful sleep.) Doctors doing electroencephalograph (EEG) work on clients with ADD find that the person has a predominant theta brainwave pattern. People without ADD are normally in the beta range. Here is a table showing altered states, measured brainwaves and the state of mind experiencing these states [1,3].

BRAINWAVE: RANGE: CORRESPONDING MENTAL STATE [1]

(excluding those ranges higher than beta such as gamma) **BETA** waves 13 to 30 Hz the fastest waves, most commonly found during our waking state, associated with outward awareness, engaged mind, arousal, actively perceiving and evaluating forms of data through the senses; also present with fear, anger, worry, hunger, and surprise. **ALPHA** waves 7 to 13 Hz associated with non-drowsy but relaxed, tranquil state of consciousness, less engagement and arousal, pleasant inward awareness, body/mind integration, present during meditation and states of relaxation. **THETA** waves 3 to 7 Hz associated with increased recall, creativity, imagery and visualization, free-flowing thought, future planning, inspiration, drowsiness, present during dreaming and REM states. **DELTA** waves .1 to 3 Hz associated with deep dreamless sleep, deep trance state pituitary release of growth hormone, self-healing, present during deep levels of non-REM sleep.

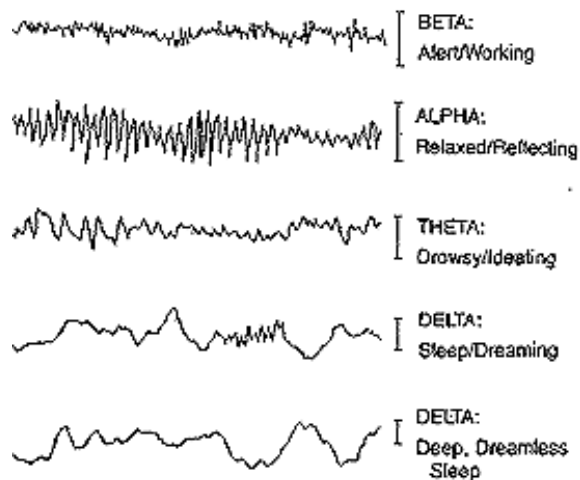


Fig.2 Different type of brain frequency

Dominant Brainwaves

Although the brain is always emitting brainwaves at each different band it is the dominant brainwaves at a particular time that dictate the conscious state of an individual. By using technology to entrain the brainwaves to become dominant in a certain band we can thereby give an individual a powerful push into the desired conscious state. By doing this we can induce numerous mental and emotional states in an individual such as meditation, excitement, motivation, anxiety, irritation, sexual excitement, relaxation, spiritualism and more [1,4].

Specific Brainwave Frequencies [1]

With field effect technology we can not only induce certain bands of brainwaves but we can be extremely precise and induce exact frequencies. Some very exact frequencies have been found to cause effects in the brain like the release of neurotransmitters and hormones such as Serotonin or Human Growth Hormone.

Brainwave Frequency List [1, 5]

This is a listing of frequencies that various parties have claimed can affect the human mind or body in some way. The following sorts of frequencies are included :

* Brainwave Frequencies - These are frequencies associated with various mental states. Using brainwave entrainment, you can coax your brainwaves to a certain frequency, and in doing so, achieve the mental state associated with that frequency.

* Healing Frequencies - These are frequencies that various parties claim could be used to heal illnesses of different kinds, or stimulate some region of the body (chakras). The medium used to do this varies - some of these parties used devices that generated EM fields which were applied to a precise part of the body, while others used vibration and sound. (I don't have any experience with using EM fields - most of my personal toying about with this stuff uses a sound medium.)

* Natural Phenomena Frequencies - This includes natural frequencies that occur in nature [Schumann's Resonance, for instance], as well as sound tones calculated from the revolution/orbit of the various planets. The sources claimed that they could affect humans in a variety of ways [1,5].

Intro

Sleep is an active process, not just the absence of wakefulness. Many of the brainwave states associated with different levels of sleep are also seen in certain states of waking consciousness as well. Awakened levels of consciousness are to waking consciousness as waking consciousness is to sleep [6].

Beta

Normally, with waking consciousness, the eyes are open and the brain is attending to external information processing, dealing with ordinary world events, talking, thinking, figuring, walking, driving, and generally doing things. EEG patterns of the brain's electrical activity at these times show rapid, rhythmic discharges of electrical activity from the neurons of the brain. These discharges are not random, but exhibit regularity and rhythmicity. In the case of the normal, externally directed attention described above, the pulses of the rhythm of these electrical discharges from the brain are rapid and of a low amplitude of electrical charge. In other words, the electrical pattern that emerges during this type of externally directed attention is rapid with a low power level. The speed of these discharges tend to always fall within a certain pulse rate speed: 30 electrical discharges per second down to around 13 discharges per second - or cycles per second (cps), or more commonly referred to as Hertz (Hz) after the scientist who did the originally defining work on discovering these interesting little facts about the pulsing discharges of brain cells during different states of consciousness. He did this with a special, new measuring device called an "Electroencephalograph" or "EEG". Electro: electrical activity, Encephalo: pertaining to the brain, Graph: graphing the information as pen-tracings on graph paper. So, this first level of human consciousness we might term "waking" consciousness, has brain cell electrical discharges that pulse in rhythmic, sweeping waves of activity across the brain's surface between 13 and 30 Hz (or times per second). It's a brain dance of electricity that sweeps across the brain in rhythmic waves. We call these rhythmic electrical waves of the brain: "brainwaves". Scientists, who have explored this interesting dance of the electrical waves that sweep across the brain, have noticed that different states of consciousness always have a corresponding, associated dance of electrical waves sweeping across the brain. They eventually cataloged these pulses of electrical activity into four general categories: Beta, Alpha, Theta and Delta.

Scientists love to name things with Greek letters and the like - it sounds more, well, scientific. It just wouldn't sound right if you named them logically in English - like A, B, C and D. They couldn't even get that straight in Greek - B, A, T and D for Beta, Alpha, Theta and Delta. As we will see later, other researchers have seen other types of brainwave activity (I'm one of those researchers!) which shows activity slower than the slowest brainwaves recognized (that was my work) and faster than the fastest brainwaves recognized and named them also after Greek letters (I'm afraid I'm guilty here as well). So, this more rapid 13-30 Hz pulsing of the brainwaves associated with externally directed, linear thinking of the ordinary "waking state" falls into the "Beta" category of brainwaves associated with 13-30 Hz [6].

Alpha

When a person turns their attention inward, or closes their eyes, the electrical activity of the brain immediately changes. The electrical discharges immediately slow down and become larger in amplitude, or have more power. Consciousness has become slower, more stilled, and more reflective. The rhythmic discharges of the brain cells slow down and become larger in amplitude - have more power. The pulsing of the brainwaves at this time falls between 13 and 7 Hz and are named "Alpha" brainwaves. This "Alpha" state of consciousness could be looked upon as inner-directed, non-linear thinking. It is still a mental state, an activity of the mental body, but inner directed - more of a "pondering" function. The Beta state could be seen as looking at the trees and the Alpha state as looking at the forest. This is the kind of electrical activity that shows up when you go to bed and first close your eyes and begin to slowly drift down into yourself and eventually into sleep. Sleep researchers have seen that volunteers awakened from Alpha sleep have uniformly reported that they were not asleep at all, but not awake either. They were in a "twilight" state of consciousness in which their mind was open and focused on a larger picture of things - the "forest" instead of the "trees," so to speak. It is interesting to notice that Zazen and Zen meditation practices show a strong Alpha pattern of brainwaves appearing. In this case, whether with eyes open or closed, the mind has been brought into a state of not seeing what the eyes are looking at - the focus is on everything simultaneously. If you keep your eyes open and go into a stare at a single spot, the eyes accommodate to the stared-at object and soon cease to see it - the mind and attention are elsewhere - internalized. At this moment, even though the eyes are open, the brainwave pattern shifts from Beta to Alpha even though the eyes are still open. Once the mind is no longer attending to the images entering the eyes from the external world, the brain behaves exactly as if the eyes were closed and the Beta brainwave function collapses and the Alpha function expands. This is what happens in an "eyes open" meditation. There is an important, fleeting moment which usually gets passed over quickly without notice when the brainwaves go from the slowest speed of Beta and cross over into Alpha: the Beta/Alpha Bridge [6,7].

The Beta / Alpha Bridge

This is not a state mentioned in the ordinary EEG literature, but it is something I have noticed and begun working with and eventually named. Technically, this is the first stage of sleep, when the eyes close and the Beta function collapses and the Alpha function expands. When external, linear, mental activity gives way to internal non-linear mental activity. Brainwaves slow down, heart rate, respiration, blood pressure and the body's general metabolism also slow down as well. As these processes slow down more and more, the Alpha brain frequencies show slower brain electrical discharges at a higher amplitude. In a non-sleep state, this Beta/Alpha bridge state is the mental place the brain goes to when it becomes hyper-efficient in dealing with the task at hand, because it can focus on the details as well as the overall scope of the problem or task at the same time. In Beta/Alpha Bridge meditation states, the mind is perfectly poised between the inner and outer worlds[1,7].

Theta

At the point when the brainwaves have slowed to the bottom of the Alpha range of frequency discharge of brain cells, at around 7 - 8 Hz, the brain goes into a completely new and different state: Theta. The Theta brainwave state is between 7 - 3.5 Hz and is the place where dreaming takes place. When the brainwaves cross over from lowest Alpha into upper Theta, this is the moment when sleep has really begun. There are a number of unique things that take place at this moment both in the brain, central nervous system and body. A portion of Theta sleep is the time in which dreaming sleep takes place. During this time a crucial part of the brainstem, called the Reticular Activating

System (RAS) goes into a special function in which it literally closes off the muscular control signals from the brain to the body. The body becomes essentially paralyzed. Some stray electrical discharges do trickle past which accounts for minor twitching of the fingers and toes. It is also during the dreaming state that the eyes move back and forth and around under the closed eyelids in what is called Rapid Eye Movement Sleep (REM Sleep). Occasionally, at the very moment that the brain goes into the dreaming state, the RAS door has not completely closed yet in the brainstem and a major brain signal gets across and the body goes into a characteristic jerk for an instant. So, during the whole period of Theta, dreaming sleep, the entire body is essentially paralyzed and makes no movement. During Alpha sleep, on the other hand, there is a lot of movement: punching the pillow, rolling into different positions to get comfortable, adjusting the blankets, etc. The reason the body saw fit to develop this intentional paralysis system of the body during dreaming sleep, was to protect the unconscious body from harming itself by physically acting out one's dreams. It is a symptom of a disorder of the RAS area of the brainstem, in which the door does not close at all the signals from the brain to the body, which we call "Sleep Walking". Since the brainstem extends down from the skull to the level of the second cervical vertebrae, Chiropractic-type misalignments of the 1st and 2nd cervical vertebrae can put torque and twist pressure on these very RAS brainstem areas and be a causative factor in sleep walking. On the other hand, upper cervical misalignments which put pressure on the RAS brainstem areas can also initiate nerve signals to the brain which jump start the sleep program in the neural cortex - since the RAS area is so intimately involved in coordinating this important area of sleep each night. This condition is known as Narcolepsy, or the abnormal falling asleep at inopportune times during the day at a moments notice. Other factors in Narcolepsy have to do with fatigue of the cellular energy system of the body - in particular the Mitochondria power house organelles of the cells. The Theta portion of sleep is where the Emotional Body recuperates, heals and "tunes" itself for the next day. There are various levels of dream material which get processed during this time, some dreams are superficial re-hashing of the day's events to clear them out, while deeper Theta dream states are associated with the clearing of deep emotional traumas - sometimes back to childhood. It is not so much what people are saying in a dream, but the emotional scenario which one is part of, that defines the Theta dreaming state as an emotional state. Dreaming is the ultimate creative exercise. You create an entire world, with all your senses, place yourself in it so convincingly that you do not even know you are in a dream while you are in it. That is creativity! In the non-sleep state, Theta is associated with intense creativity, visualization ability, imagination and problem-solving. Some of the most famous people in history have had their greatest moments of creative achievement and problem-solving at night and in the middle of a dream - they wake up with the full-blown answer. In meditation, the Theta state is associated with the classic "out of the body" experience. One is no longer aware that one has a body. One is transported to a beautiful place with the "Master". In Christianity, this was the place of Holy visitation, conversing with angels, meeting with the saints, etc. In the Shamanistic traditions, this is the realm of the Shamanic "Journey". Let's backtrack a bit: on the journey to Theta, we have a second important crossover point in consciousness: The Alpha/Theta Bridge [1].

The Alpha / Theta Bridge

This is the balance point between the Mental and Emotional bodies. It is the place where our mental belief systems and our emotional states feed one another. It is where we have the possibility of having non-attached emotional awareness at a physical level. When the King and Queen rein hand in hand in true partnership, the whole realm flowers and blossoms in harmony.

The Theta / Delta Bridge

When the Theta brainwave activity slows to the bottom-most frequencies of Theta at around 3.5 Hz, dreaming stops and the brainwaves cross over into Delta - the slowest and largest amplitude electrical activity of the neurons of the cortex. At this crossover point in brain frequencies lies the place where emotional imbalances, which express themselves in the physical body, are balanced and healed. In the waking state, this is the place where the brain goes to access long-term memory. Usually, when you can recall a name, you concentrate harder - but this only increases the speed of brainwaves further into Beta. Where the brainwaves need to go to get this memory information is down to the Theta / Delta Bridge [1].

Delta

Once the sleep cycle reaches Delta, the RAS area of the brainstem releases the constraints on the communication between the brain and the body's muscles. However, the body still remains completely still and non-moving through the whole period of Delta sleep. This is not because the body is paralyzed by the RAS, but because the body is now in its most quiescent, relaxed and stress-reduced state. As the brainwaves sink deeper into slower and slower Delta brainwave patterns, the body goes into the lowest blood pressure, respiration, heart rate, metabolism and body temperature it experiences. This is the time at night in which the body recuperates, heals and re-tunes itself for the next day. There are no mental processes, no emotional processes and no sense of time. This is the most difficult time to try to awaken a person sleeping [1].

In meditation states, this is the "Void" state or "White Light" state - a state of timeless suspension.

Ecstatic and Extraordinary States:

- Lambda
- Hyper Gamma
- Gamma
- Epsilon

Classic neurophysiology, until very recently, has recognized only the four brainwave states mentioned so far: Beta, Alpha, Theta and Delta. Recently new evidence has emerged of brainwave states above the highest recognized brainwave frequencies of Beta (30 Hz). These higher-than Beta frequencies are being called Gamma brainwaves. These Gamma brainwaves resonate at around 40 Hz and seem to be associated with the function of the brain which holographically synthesizes all the bits of individual data from various areas of the brain and fuses them all together in a higher point of view. I began to see evidence a number of years ago, that certain of my patients were exhibiting slower-than-Delta brainwave activity. This brainwave activity seemed to be associated with states of self-awareness, higher levels of insight and information, psychic abilities, out of the body experiences, etc. Many EEG machines are not even set up to measure frequencies outside the classic Beta-Alpha-Theta-Delta ranges. Once I started looking more closely at this phenomenon, I saw more and more evidence of it happening. Eventually, I named this new region of brain activity and states of consciousness associated with it: EPSILON (since this was the next Greek letter after Delta - and it sounded cool). Later I came across references on the Internet from EEG researchers who were noticing extremely high brainwave frequencies above Gamma, at up to 100 Hz. Interestingly, they were reporting that these states seemed to be associated with states of self-awareness, higher levels of insight and information, psychic abilities, out of the body experiences, etc. - word-for-word the same descriptions I was making for the Epsilon state which was an extremely slower than Delta (below 0.5 Hz) set of frequencies. I thought this was extraordinary in itself: that totally opposite speed brainwave frequencies - some at 100 Hz and others at less than 0.5 Hz - should have exactly the same states of consciousness associated with them. Since these researchers did not seem to have come up with a name for these high-range brain frequency states, I named them: Hyper Gamma. Later information showed new evidence of frequencies even higher than this, at almost 200 Hz. These I have named: Lambda brainwave frequencies and states of consciousness. My later realization was that these Hyper Gamma / Lambda and my Epsilon frequencies, must be linked together in a circular relationship -where, if you looked with a magnifying glass at an extremely slow Epsilon brain frequency, you would see hidden within it a modulation frequency of 100 - 200 Hz. This being so, if you were to stand back far enough from an extremely fast 200 Hz brainwave frequency, you would see that is it riding on the crest of a slow motion modulating wave of Epsilon.I believe it is this Epsilon state of consciousness which is the state Yogi's go into when they achieve states of "suspended animation" - where western medical doctors can perceive no heartbeat, respiration or pulse. I think that the Hyper Gamma and Lambda states of consciousness are probably the states associated with the ability of certain sects of Tibetan monks who can mediate in the Himalayan mountains in sub-zero temperatures with scanty clothing and melt the snow all around them.But how are we to know that we are not just dreaming this experience we are having right now? Pinch ourselves on the arm to wake up? I'm afraid it would just be dream fingers pinching a dream arm and dreaming that the pain was not a dream. Perhaps we might even dream that we woke up from this dream...[8].

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This is not a state mentioned in the ordinary EEG literature, but it is something I have noticed and begun working with and eventually named. Technically, this is the first stage of sleep, when the eyes close and the Beta function collapses and the Alpha function expands. When external, linear, mental activity gives way to internal non-linear mental activity. Brainwaves slow down, heart rate, respiration, blood pressure and the body's general metabolism also slow down as well. As these processes slow down more and more, the Alpha brain frequencies show slower brain electrical discharges at a higher amplitude. In a non-sleep state, this Beta/Alpha bridge state is the mental place the brain goes to when it becomes hyper-efficient in dealing with the task at hand, because it can focus on the details as well as the overall scope of the problem or task at the same time. In Beta/Alpha Bridge meditation states, the mind is perfectly poised between the inner and outer worlds.

Theta

At the point when the brainwaves have slowed to the bottom of the Alpha range of frequency discharge of brain cells, at around 7 - 8 Hz, the brain goes into a completely new and different state: Theta. The Theta brainwave state is between 7 - 3.5 Hz and is the place where dreaming takes place. When the brainwaves cross over from lowest Alpha into upper Theta, this is the moment when sleep has really begun. There are a number of unique things that take place at this moment both in the brain, central nervous system and body. A portion of Theta sleep is the time in which dreaming sleep takes place. During this time a crucial part of the brainstem, called the Reticular Activating System (RAS) goes into a special function in which it literally closes off the muscular control signals from the brain to the body. The body becomes essentially paralyzed. Some stray electrical discharges do trickle past which accounts for minor twitching of the fingers and toes. It is also during the dreaming state that the eyes move back and forth and around under the closed eyelids in what is called Rapid Eye Movement Sleep (REM Sleep). Occasionally, at the very moment that the brain goes into the dreaming state, the RAS door has not completely closed yet in the brainstem and a major brain signal gets across and the body goes into a characteristic jerk for an instant. So, during the whole period of Theta, dreaming sleep, the entire body is essentially paralyzed and makes no movement. During Alpha sleep, on the other hand, there is a lot of movement: punching the pillow, rolling into different positions to get comfortable, adjusting the blankets, etc. The reason the body saw fit to develop this intentional paralysis system of the body during dreaming sleep, was to protect the unconscious body from harming itself by physically acting out one's dreams. It is a symptom of a disorder of the RAS area of the brainstem, in which the door does not close at all the signals from the brain to the body, which we call "Sleep Walking". Since the brainstem extends down from the skull to the level of the second cervical vertebrae, Chiropractic-type misalignments of the 1st and 2nd cervical vertebrae can put torque and twist pressure on these very RAS brainstem areas and be a causative factor in sleep walking. On the other hand, upper cervical misalignments which put pressure on the RAS brainstem areas can also initiate nerve signals to the brain which jump start the sleep program in the neural cortex - since the RAS area is so intimately involved in coordinating this important area of sleep each night. This condition is known as Narcolepsy, or the abnormal falling asleep at inopportune times during the day at a moments notice. Other factors in Narcolepsy have to do with fatigue of the cellular energy system of the body - in particular the Mitochondria power house organelles of the cells. The Theta portion of sleep is where the Emotional Body recuperates, heals and "tunes" itself for the next day. There are various levels of dream material which get processed during this time, some dreams are superficial re-hashing of the day's events to clear them out, while deeper Theta dream states are associated with the clearing of deep emotional traumas - sometimes back to childhood. It is not so much what people are saying in a dream, but the emotional scenario which one is part of, that defines the Theta dreaming state as an emotional state. Dreaming is the ultimate creative exercise. You create an entire world, with all your senses, place yourself in it so convincingly that you do not even know you are in a dream while you are in it. That is creativity!. In the non-sleep state, Theta is associated with intense creativity, visualization ability, imagination and problem-solving. Some of the most famous people in history have had their greatest moments of creative achievement and problem-solving at night and in the middle of a dream - they wake up with the full-blown answer [7,8].

In meditation, the Theta state is associated with the classic "out of the body" experience. One is no longer aware that one has a body. One is transported to a beautiful place with the "Master". In Christianity, this was the place of Holy visitation, conversing with angels, meeting with the saints, etc. In the Shamanistic traditions, this is the realm of the

Shamanic "Journey". Let's backtrack a bit: on the journey to Theta, we have a second important crossover point in consciousness: The Alpha/Theta Bridge[8].

The Alpha / Theta Bridge

This is the balance point between the Mental and Emotional bodies. It is the place where our mental belief systems and our emotional states feed one another. It is where we have the possibility of having non-attached emotional awareness at a physical level. When the King and Queen rein hand in hand in true partnership, the whole realm flowers and blossoms in harmony.

The Theta / Delta Bridge

When the Theta brainwave activity slows to the bottom-most frequencies of Theta at around 3.5 Hz, dreaming stops and the brainwaves cross over into Delta - the slowest and largest amplitude electrical activity of the neurons of the cortex. At this crossover point in brain frequencies lies the place where emotional imbalances, which express themselves in the physical body, are balanced and healed. In the waking state, this is the place where the brain goes to access long-term memory. Usually, when you can recall a name, you concentrate harder - but this only increases the speed of brainwaves further into Beta. Where the brainwaves need to go to get this memory information is down to the Theta / Delta Bridge.

Delta

Once the sleep cycle reaches Delta, the RAS area of the brainstem releases the constraints on the communication between the brain and the body's muscles. However, the body still remains completely still and non-moving through the whole period of Delta sleep. This is not because the body is paralyzed by the RAS, but because the body is now in its most quiescent, relaxed and stress-reduced state. As the brainwaves sink deeper into slower and slower Delta brainwave patterns, the body goes into the lowest blood pressure, respiration, heart rate, metabolism and body temperature it experiences. This is the time at night in which the body recuperates, heals and re-tunes itself for the next day. There are no mental processes, no emotional processes and no sense of time. This is the most difficult time to try to awaken a person sleeping. In meditation states, this is the "Void" state or "White Light" state - a state of timeless suspension. Classic neurophysiology, until very recently, has recognized only the four brainwave states mentioned so far: Beta, Alpha, Theta and Delta. Recently new evidence has emerged of brainwave states above the highest recognized brainwave frequencies of Beta (30 Hz). These higher-than Beta frequencies are being called Gamma brainwaves. These Gamma brainwaves resonate at around 40 Hz and seem to be associated with the function of the brain which holographically synthesizes all the bits of individual data from various areas of the brain and fuses them all together in a higher point of view. I began to see evidence a number of years ago, that certain of my patients were exhibiting slower-than-Delta brainwave activity. This brainwave activity seemed to be associated with states of self awareness, higher levels of insight and information, psychic abilities, out of the body experiences, etc. Many EEG machines are not even set up to measure frequencies outside the classic Beta-Alpha-Theta-Delta ranges. Once I started looking more closely at this phenomenon, I saw more and more evidence of it happening. Eventually, I named this new region of brain activity and states of consciousness associated with it: EPSILON (since this was the next Greek letter after Delta - and it sounded cool). Later I came across references on the Internet from EEG researchers who were noticing extremely high brainwave frequencies above Gamma, at up to 100 Hz. Interestingly, they were reporting that these states seemed to be associated with states of self awareness, higher levels of insight and information, psychic abilities, out of the body experiences, etc. - word-for-word the same descriptions I was making for the Epsilon state which was an extremely slower than Delta (below 0.5 Hz) set of frequencies. I thought this was extraordinary in itself: that totally opposite speed brainwave frequencies - some at 100 Hz and others at less than 0.5 Hz - should have exactly the same states of consciousness associated with them. Since these researchers did not seem to have come up with a name for these high-range brain frequency states, I named them: HyperGamma. Later information showed new evidence of frequencies even higher than this, at almost 200 Hz. These I have named: Lambda brainwave frequencies and states of consciousness. My later realization was that these HyperGamma / Lambda and my Epsilon frequencies, must be linked together in a circular relationship -where, if you looked with a magnifying glass at an extremely slow Epsilon brain frequency, you would see hidden within it a modulation frequency of 100 - 200 Hz. This being so, if you were to stand back far enough from an extremely fast 200 Hz brainwave frequency, you would see that is it riding on the crest of a slow motion modulating wave of Epsilon. I believe it is this Epsilon state of consciousness which is the state Yogi's go into when

they achieve states of "suspended animation" - where western medical doctors can perceive no heart beat, respiration or pulse. I think that the HyperGamma and Lambda states of consciousness are probably the states associated with the ability of certain sects of Tibetan monks who can mediate in the Himalayan mountains in sub-zero temperatures with scanty clothing and melt the snow all around them. But how are we to know that we are not just dreaming this experience we are having right now? Pinch ourselves on the arm to wake up? I'm afraid it would just be dream fingers pinching a dream arm and dreaming that the pain was not a dream. Perhaps we might even dream that we woke up from this dream. The slower the brain frequency the faster the learning. In theta learning can be 1 time and in alpha as much as 20 times to absorb information (see below).

Brain Waves and Age[1]

The table below tells the patterns of brain wave activity across different ages and states of awareness with the number of repetitions required to learn new behaviour patterns.

Age	Brain wave	Cycles/sec	Usual state for adults	No. of repetitions required for new behaviour
14+	Beta	14 - 21	Normal awake	Thousands
7 - 14	Alpha	7 - 14	Light sleep, meditation	21 (approx.)
4 - 7	Theta	4 - 7	Sleep, 'fight or flight'	1 or 2
0 - 4	Delta	0.5 - 4	Deep sleep	-

NB. the repetitions are for new behaviour not information but information is also absorbed quicker in lower brain wave patterns. From birth to four, babies' brains operate in the delta state, with brain waves running below 4 cycles per second. In adults, this level of brain wave activity is experienced in the deepest levels of sleep. From four to seven, children operate in theta state, with brain waves running between four and seven cycles per second. In adults, this level of brain wave activity is experienced during sleep and also during states of fear when the body goes into a 'fight or flight' response. This is a powerful level from which to initiate change. In this state, we only need one or two experiences of learning to change behaviour. From the ages seven to fourteen, we live in the alpha state of seven to fourteen cycles per second. In adults, this is associated with light sleep, meditation, or eyes closed relaxation. At this level effective learning can take place after about 21 repetitions. Practice a new behaviour for 21 consecutive days and that behaviour becomes a habit. Research has shown that strong levels of physical healing can take place when the brain is at 10 cycles per second. From puberty through adulthood the brain operates in the beta state, 14 - 21 cycles per second. This is experienced in the normal state of eyes open, awake and alert. In this state it may take many thousands of repetitions to learn a new behaviour. To create significant change in our lives at this level takes extensive deal of time and effort.

Brain waves and health

Delta & Theta brain waves are very good for health in general and are normally obtained by sleep but for students or others who work too hard, accessing them at the same time as other brain waves is rejuvenating. An excess of Delta usually indicates depression, either physical or emotional and sleep problems. Many researchers have noted a discrepancy between the EEG of subjects with learning disabilities or ADD and normal subjects. Typically, the ADD subjects were characterized by brain activity on the slower end of the frequency spectrum "The most

important characteristic is either an excessive amount of theta activity, a lack of beta activity or a combination of these" Lubar, J. F. (1985). EEG biofeedback and learning disabilities. Theory into Practice, 24(2), 106-111

Important Medical Warning[1,4,8]

One manufacturer (Brain Sound Studio TM) recommends that the studio and therefore by inference the binaural sounds should not be used by pregnant women, those using a pacemaker, and those who have had or are prone to seizures or are epileptic. Therefore I recommend that if you have a medical condition or are on medication please print this out and see a Medical Doctor to check if you are at risk before you use any binaural type music.

Specific Brain Frequencies

The information below shows the effects of specific frequencies within each brain wave frequency range:

Delta Brain Waves (0.5 to 4Hz)

0.5 Hz - Relaxation, helps soothe headaches

0.5 - 1.5 Hz - Pain relief. Endorphin release

0.9 Hz - Euphoric feeling

1 Hz - Wellbeing. Harmony and balance

2.5 Hz - Production of endogenous opiates (pain killers, reduce anxiety)

2.5 Hz - Relieves migraine pain. Produces endogenous opiates

3.4 Hz - Helps achieve restful sleep

3.5 Hz - Feeling of unity with everything. Whole being regeneration

3.9 Hz - Self renewal, enhanced inner awareness

4.0 Hz - Enkephalin release for reduced stress

4.0 Hz - Allows brain to produce enkaphalins, all natural pain killer

4.0 Hz - Full memory scanning. Releases enkephalins

4.0 Hz - Vital for memory and learning. Problem solving, object naming

1 - 3 Hz - Profound relaxation, restorative sleep. Tranquillity and peace

Theta Brain Waves (4 to 8 Hz)

4.5 Hz - Brings about Shamanic/Tibetan state of consciousness, Tibetan chants.

4.9 Hz - Induce relaxation and deeper sleep

4.9 Hz - Introspection. Relaxation, meditation

5 Hz - Reduces sleep required. Theta replaces need for extensive dreaming

5.35 Hz - Allows relaxing breathing, free and efficient

5.5 Hz - Inner guidance, intuition

6.5 Hz - Centre of Theta frequency. Activates creative frontal lobe

7.5 Hz - Activates creative thought for art, invention, music. Problem solving

7.5 Hz - Ease of overcoming troublesome issues

7.83 Hz - Schumann earth resonance. Grounding, meditative, Leaves you revitalized

3 - 8 Hz - Deep relaxation, meditation. Lucid dreaming

3 - 8 Hz - Increased memory, focus, creativity

4 - 7 Hz - Profound inner peace, emotional healing. Lowers mental fatigue

4 - 7 Hz - Deep meditation, near-sleep brainwaves.

Alpha brain waves (8 to 12Hz)

8- 10 Hz Super-learning new information, memorisation, not comprehension.

8.22 Hz - Associated with the mouth. Brings creativity

10 Hz - Enhanced serotonin release. Mood elevation, arousal, stimulant

- 10 Hz** - Provides relief from lost sleep, improves general mood
- 10 Hz** - Mood elevator. Used to dramatically reduce headaches
- 10 Hz** - Clarity, subconscious correlation. Releases serotonin
- 11 Hz** - Relaxed yet awake state
- 12 Hz** - Centering, mental stability.
- 11 - 14 Hz** - Increased focus and awareness
- 12 - 14 Hz** - Learning frequency, good for absorbing information passively
- Beta brain waves (13 to 30Hz)
- 14 Hz** - Awakeness, alert. Concentration on tasks, Focusing, vitality.
- 16 Hz** - Bottom of hearing range. Releases oxygen/calcium into cells
- 12 - 15 Hz** - Relaxed focus, improved attentive abilities
- 13 - 27 Hz** - Promotes focused attention toward external stimuli
- 13 - 30 Hz** - Problem solving, conscious thinking
- 18-24 Hz** — Euphoria, can result in headaches, anxiety.

NB. Frequencies in italics cover more than one brain wave frequency range. The release of endorphins by the delta brainwave can also be achieved by meditation, runners high, breathing exercises, etc. In my opinion the brain waves and the specific frequencies could be used to help explain how many healing techniques work with more research, case studies and relation to other scientific disciplines.

EEG Bas Fined Brain Frequencies.

A very different type of auditory evoked potential are the Auditory Steady-State Responses (ASSR), which are responses to stimuli presented at rates such that the brain response to one stimulus is overlapped with responses to other stimuli. Responses to slower modulation rates (<20 Hz) appear to originate largely in cortical structures; responses to faster rates (70 Hz and higher) appear to reflect brainstem processes. ASSRs to rates >70-Hz show great promise for rapid assessment of hearing infants. The multiple auditory steady-state evoked response (EEG & MASTER) technique provides a rapid and objective assessment of hearing. The technique is based on the statistical evaluation of the electrophysiological responses evoked by multiple auditory tones presented simultaneously. These auditory steady-state responses can be recorded from the human scalp intermixed with the other activity in the electroencephalogram (EEG). A combination of averaging and frequency-analysis can distinguish the responses from the background EEG. MASTER typically presents 8 continuous tones (4 to each ear) and each tone is sinusoidally modulated at a unique frequency. The detection of the interwoven responses becomes possible after the electrophysiological data are transformed into the frequency domain. MASTER evaluates the responsiveness of the auditory system to several tonal frequencies in the same time it would take to record one response if each stimulus was presented separately [9,10].

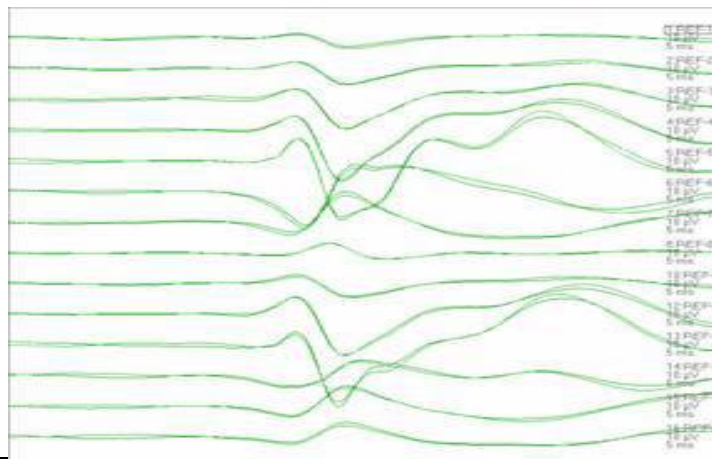


Fig. EEG Out put Result for brain frequency

CONCLUSION

The brain is a complex and intricate organ serving yet leading the rest of the body. Mapping the areas of the brain is the first step in understanding how humans think and interact. Using electrodes as a non-invasive technique scientist are taking those first steps into the brain. The areas of study discussed in this paper are new and expanding every day. Where there is great achievement there is also a great responsibility. Researchers debate as to the validity of the tests and where they can be applied.

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