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## Alpha Brain Waves and Biofeedback Science

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Often when people ask, "What is **Alpha**?", they are really asking, "What is Alpha good for?", and "What does Alpha mean to me?" Answering the first question leads into the other two.

**What is Alpha?** It is one of four **basic brain waves** [**Delta**, **Theta**, **Alpha**, and **Beta**] which make up the **EEG**, which is short for **electroencephalogram**. These are all oscillating electrical voltages in the brain, but they are very tiny voltages, just a few millionths of a volt. The **Alpha** waves oscillate about 10 time per second, and the **range is 8-13 cycles per second**. The brain waves called "Alpha" were the first to be discovered (around 1908, by an Austrian Psychiatrist named **Hans Berger**). That is why they are called "Alpha", they were first. Alpha is the first letter of the Greek alphabet, like our "a".

Many hundreds of scientists have spent a lot of time studying these basic brain waves of the EEG, so there is a lot of basic knowledge about what **Alpha** is and what makes it appear and disappear in our brains. Yes, Alpha appears and disappears. It is not always present. For example, in deep sleep there is no Alpha, and if someone is very highly aroused as in fear or anger, again there is virtually no Alpha. **Delta** is seen only in the **deepest stages of sleep** (Stages 3 and 4). **Theta** is seen in **light sleep and drowsiness** (sleep stages 1 and 2). **Alpha** is seen in wakefulness where there is a **relaxed and effortless alertness**. **Beta** is seen in highly stressful situations, and where there is difficult **mental concentration and focus**.



**Dr. Hans Berger**

**Delta** waves are the slowest oscillating waves (0-4 cycles per second). **Theta** waves oscillate somewhat faster (4-7 cycles per second). **Alpha** waves oscillate 8-13 times per second. **Beta** waves oscillate still faster (13-40 cycles per second). There are many other kinds of electrical activity in the brain, especially the short-lived evoked potentials that occur when the brain responds to sensory input (like a sound, or a touch, or a flash of light). However, the four basic EEG waves of **Delta**, **Theta**, **Alpha**, and **Beta** constitute the standard lineup of EEG activity.

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**What is Alpha good for?** The foregoing discussion makes the point that each of the four basic EEG waves is linked to a different state of consciousness. Each of the four types of waves is good for something different. However, we can get into trouble if we can not turn on the type of brain wave needed for the task at hand. For example, if we can not turn on **Theta** and **Delta** waves, we will suffer from insomnia, among other things. On the other hand, people who can turn on the ideal brain waves to deal with each and every situation are considered gifted.

One useful metaphor compares the four basic brain waves (**Delta**, **Theta**, **Alpha**, **Beta**) with the **four gears on a car**. **Delta** (the slowest wave) is first gear. **Theta** is second gear. **Alpha** is third gear. **Beta** is fourth gear. No one gear is best for every driving situation, and no one brain wave is best for all of the challenges of life. We get into trouble if one of the gears on our car goes out, or if we forget to use some of the gears. For example if we drive our car starting in first gear,

and then shifting directly into fourth gear (skipping second and third), we will have low gas mileage and high repair bills. The same is true of our brains. Sadly, **many people often skip their second and third brain gears (Theta and Alpha)**. The consequences of driving our brains in this manner are low productivity and high medical bills. How does this happen?

The way this occurs in everyday life can be illustrated by an example. People often wake up suddenly out of a deep sleep (**Delta**) with an alarm. Then they immediately feel stress and anxiety (**Beta**) about being late or being under time pressure. After insufficient sleep they pour caffeine down their throats to force themselves into (Beta) wakefulness, and the **caffeine** suppresses **Theta** and **Alpha**, while promoting **Beta**. All day they work under stress, pressure, and time urgency (Beta, Beta, and more Beta), until at night, they fall exhausted into deep sleep (Delta), having spent too little time unwinding, relaxing, and drowsing (which would have given them a bit more **Alpha** and **Theta**). Thus many people shift their brains suddenly and forcefully from Delta to Beta, and then back to Delta.

**Alpha** production is an innate skill of our brains, but one consequence of the modern stressful lifestyle is that we forget how to produce **Theta** and **Alpha** brain waves. Then we easily fall victim to anxiety and stress-related diseases. Anxiety and stress measurably reduce the strength of our immune systems. People who have more **Alpha** brain waves have less anxiety. Thus having **more Alpha waves** could mean **less anxiety and, correspondingly, stronger immune systems**, and this is good for everyone.

**Creativity** is another activity for which **Alpha** is helpful. Scientists have shown that highly creative people have different brain waves from normal and non-creative people. In order to have a **creative inspiration**, your brain needs to be able to generate a **big burst of Alpha**, mostly on the left side of the brain. The brains of creative people **can generate** these big **Alpha** bursts, and do so when they are faced with problems to solve. Normal and non-creative people do not produce Alpha increases when they are faced with problems, and so they can not come up with creative ideas and solutions. Any time you have an insight or an inspiration, you know your brain just produced more Alpha waves than usual. Increased creativity is helpful for everyone.

**Peak performance** is another activity for which **Alpha** is helpful. Recently sports scientists have shown that increases of Alpha brain waves (often in the left side of the brain) precede peak performance. One key difference between novice and elite athletes is in their brain waves. Just before his best free throws, an elite basketball player will produce a burst of **Alpha** on the left side of their brain. Just before their best strokes, elite golfers will produce a burst of Alpha in their left brain. Just before their best shots, elite marksmen and archers will produce a burst of Alpha in their left brains. Novice and intermediate athletes do not show this Alpha pattern. However, one study of archers training over many weeks, showed that **as they improved their performance, they gradually increased the amount of left brain Alpha which occurred just before their best shots**. The Alpha brain waves seemed to be essential for peak performance and were increased, albeit slowly, by the archery training.

**What does Alpha mean to me?** If you want to feel **less stress and anxiety**, you should increase the amount of your **Alpha** waves. This may also improve the **strength of your immune systems**, since stress weakens the immune systems. If you want to be **more creative**, you should learn how to increase the amount of your Alpha waves. If you want to have **more peak performance** in athletic activity, and in other areas of your life, you should learn how to **increase the amount of your Alpha waves**. Some people are born healthy and mellow and gifted with creativity and athletic prowess. But what if you are not so lucky?

Is there a method to help everyone to have more **Alpha** waves?

## Yes, there is! [Alpha Wave Biofeedback Training](#) from [Biocybernaut Institute](#)

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