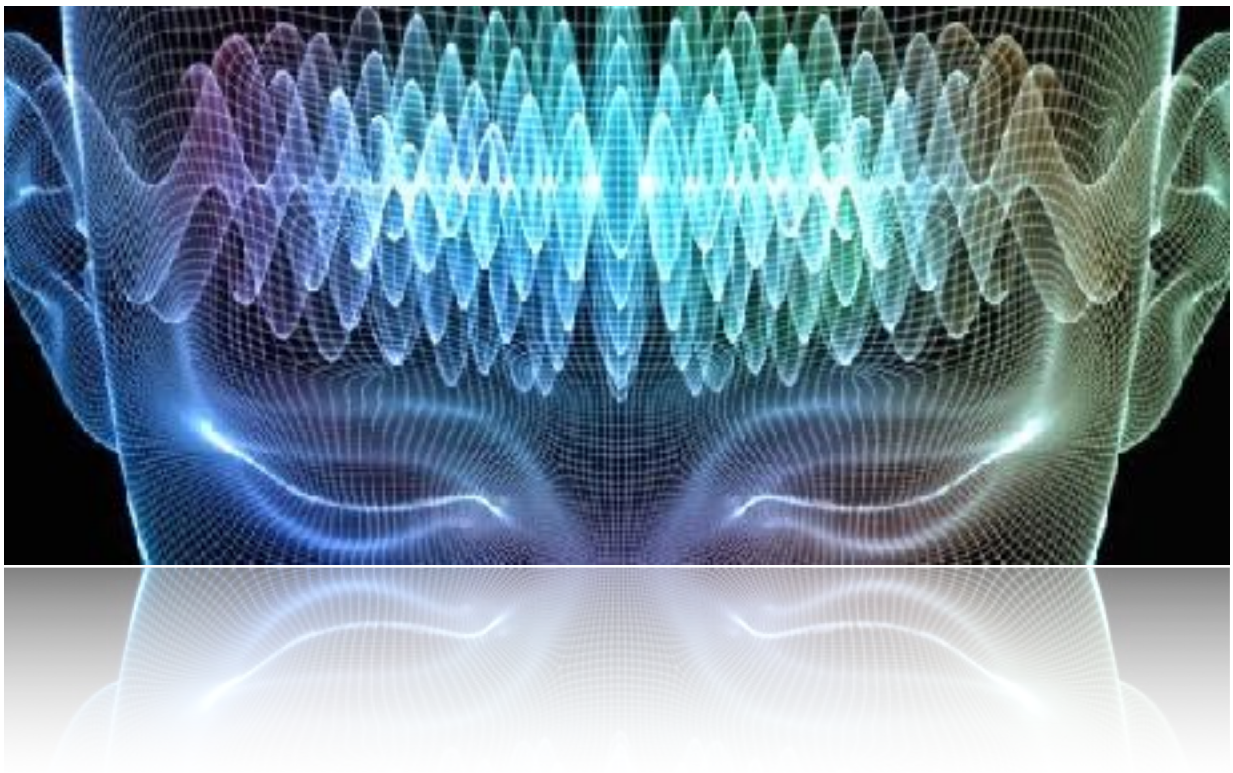
A Beginner's Guide to Binaural Beats



4th Edition

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1.

How Binaural Beats Work

A Short History

Heinrich Wilhelm Dove first discovered the theory of binaural beats in 1839. Dove was a respected German who worked as a physicist and meteorologist and greatly influenced the science of climatology.

Dove was a keen experimenter, and it was one of his experiments that paved the way for exploration in the field of brainwave entrainment, albeit unknowingly at the time.

Dove discovered that illusory “beats” are perceived when pure tones of slightly different frequency are separately and simultaneously presented to each ear.

In simplified terms: When the brain simultaneously hears two tones of different frequencies - one sent to the right ear and one to the left ear - it causes the brain to perceive a new tone (a binaural beat).

This tone (beat) is the mathematical difference between the two frequencies sent to the left and right ears. Dove wasn’t aware of this mathematical difference at the time of his experiment.

Dove's key insight was to realize that for this process to occur the perceived tone (beats) must exist solely within the auditory (hearing) system, specifically the part which processes binaural (e.g., stereo) sound.

Of course, headphones weren’t available in 1839, so Dove did the following: He had a volunteer stand in a room. On one side of the room he placed a tuning fork. The fork was

connected to a tube that ran to the person's right ear. He then placed a tuning fork on the other side of the room and ran a tube to the person’s left ear.

The forks didn't vibrate at quite the same low frequency, so the subject received different frequencies to the right and left ears.

Dove documented that his subject perceived the effect of the two frequencies combining as a slow beat. We now know this to be a binaural beat.

Dove’s experimentation was largely the subject of curiosity until 1973, when Dr Gerald Oster, a biophysicist, presented a paper in the Scientific American - titled Auditory Beats In The Brain - that sparked further interest and research in brainwave entrainment.

Oster's paper gave the subject renewed relevance and raised questions among the scientific community regarding the ability of sound to aid medical procedure.

Oster viewed binaural beats as having considerable research value, and as a potential diagnostic medical tool.

In terms of research, he saw the potential of this phenomenon to explain features of the auditory system, such as how we locate sounds spatially in our environment and selectively single-out individual sounds from background noise.

From a medical perspective, Oster saw potential to not only diagnose auditory impairments but to identify a range of seemingly unrelated medical issues.

For example, Oster found strong data that suggested that a diminished ability to hear binaural beats was an early predictor for Parkinson's Disease. He also found that a variation in the ability to perceive binaural beats correlated with certain neurological conditions, and when female subjects were in hormonal cycles.

But central to his thesis, and indeed what sparked renewed interest and research into how binaural beats might help problems such as anxiety, pain and insomnia, was that processing binaural beats involves different neural pathways to conventional hearing, and that listening evokes specific neural responses — even when both

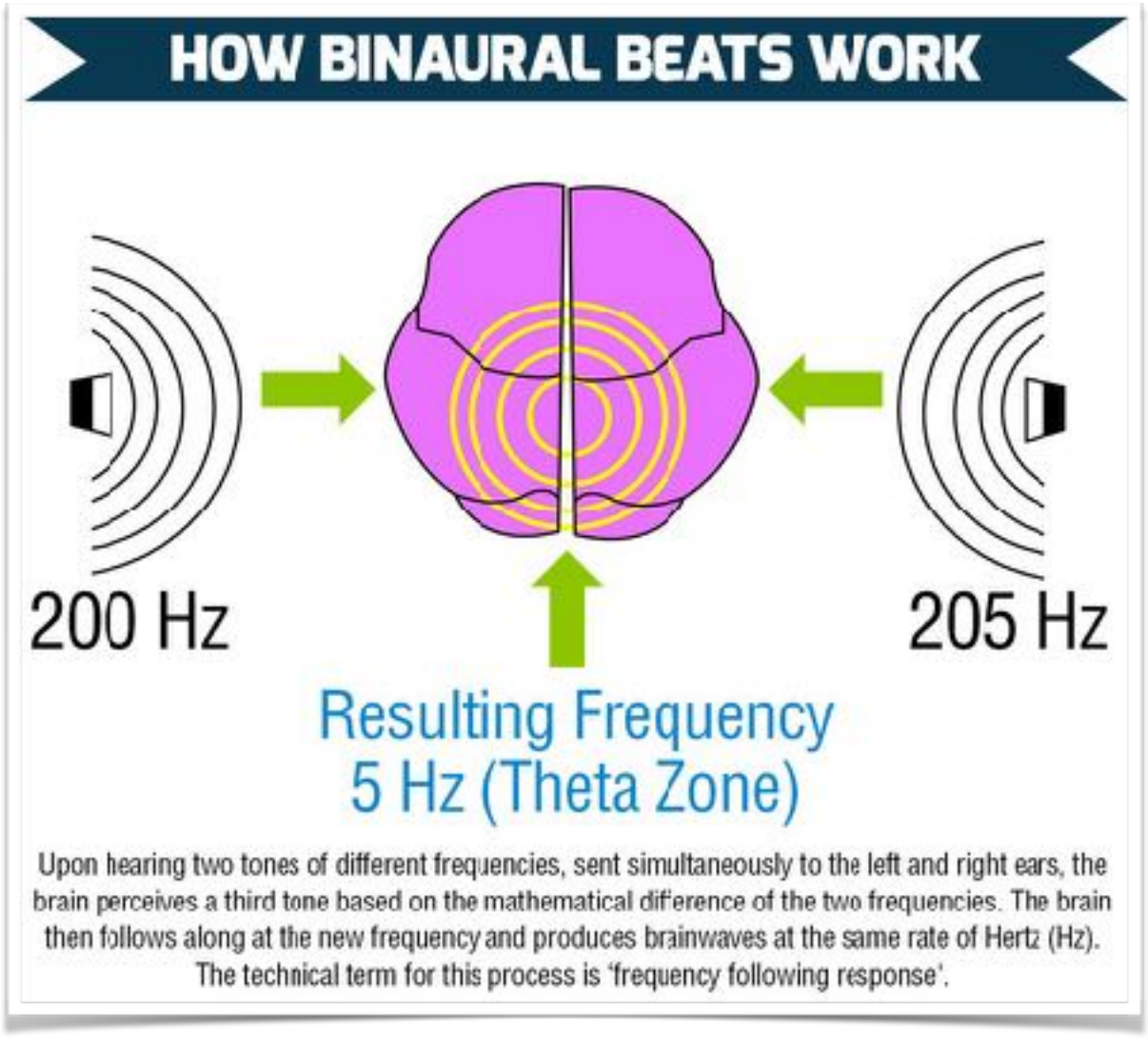
frequencies (those sent to the left and right ears) are below the human hearing threshold.

The Frequency Following Response (FFR)

The science of binaural beats occurs naturally in the brain. A different sound (tone) frequency is sent to the left and right ears through headphones. A sound frequency is measured is Hertz (Hz), with 1 Hz equal to one cycle (of the signal) per second.

Upon receiving the two different frequencies to the left and right ears, the brain responds by interpreting the two frequencies as one consistent, rhythmic sound frequency, known as a binaural beat(s).

This resulting frequency that the brain interprets and subsequently follows along to ("entrainment") is the mathematical difference between the two frequencies that were initially sent to the left and right ears. This is demonstrated in the diagram below.



For example: If the right ear is sent a tone of 200 Hz, and the left ear is sent a tone of 205 Hz, the brain's waves (brainwaves) begin to vibrate at the difference between these two signals (e.g., 5 Hz). The technical term for this process is 'Frequency Following Response' (FFR).

The Frequency Following Response (FFR) is well established across many species. It is simply a reaction generated by periodic or nearly periodic auditory stimuli.

Even the simple beating of a drum can induce a Frequency Following Response. This is because the rhythm contains hypnotic properties that encourage the brain to follow along.

Proof of this was discovered by scientist Melinda Maxfield, PhD, who conducted research on the drumbeats used during rituals of ancient cultures. She found that the drums often beat at a steady rate of 4.5 beats per second.

This consistent beat induces a trance-like state for the tribe, due to the brain being entrained to a 4.5 beats per second frequency. 4.5 Hz is a low Theta frequency on the brainwave spectrum, associated with deep relaxation and meditative states.

Indeed, in almost every ancient culture, repetitive beat formats have played an important role in wellbeing and prosperity. For example, through the use of repetitive drumming and chanting, Tibetan monks, Native American

shamans, Hindu healers, and master Yogis have been able to induce meditative states that promote physical and emotional healing.

The Brainwave Spectrum

In the same way that electrical equipment runs at specific frequencies, so does the brain. As previously noted, these frequencies are measured in Hertz (Hz).

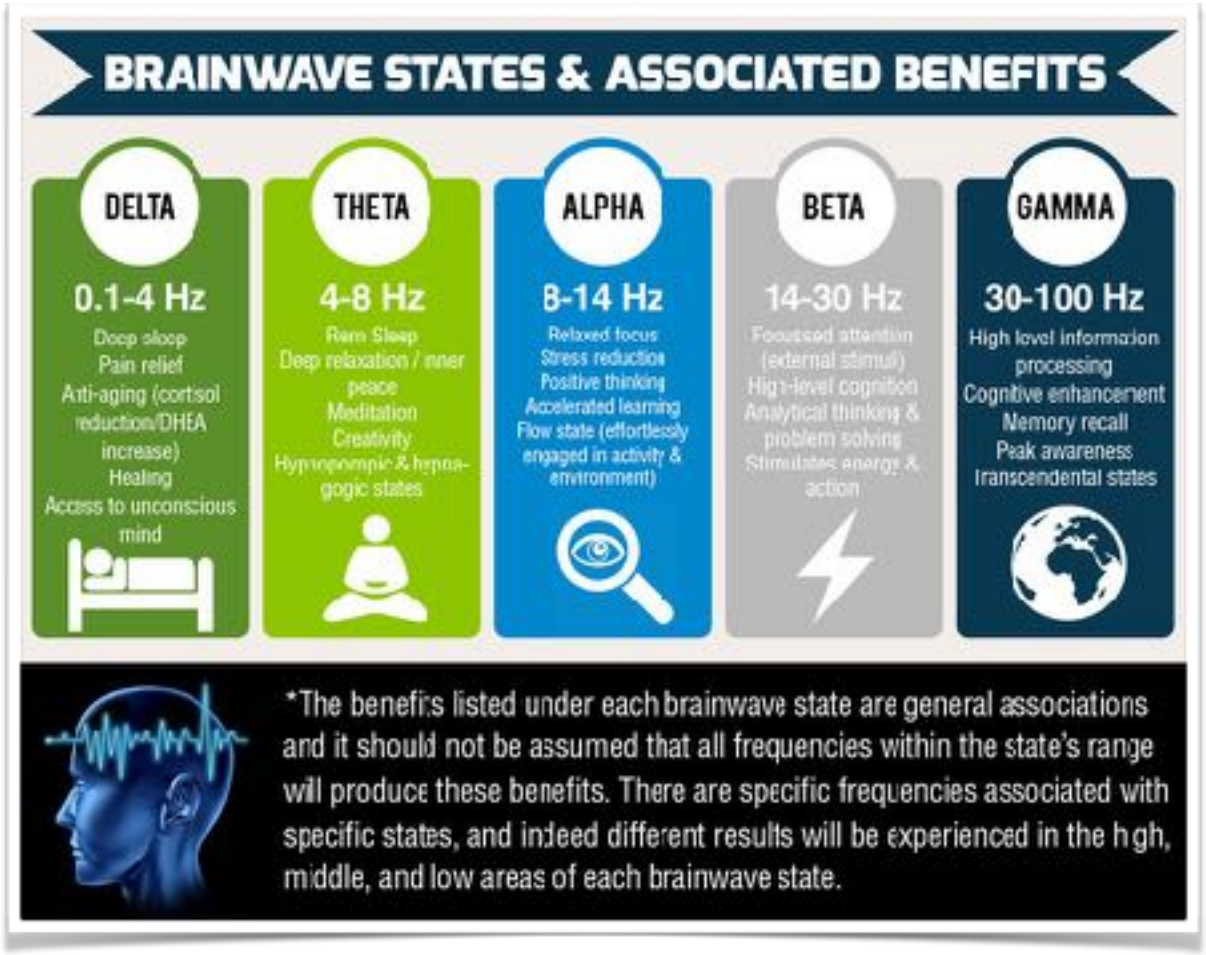
When we are in a high state of anxiety the speed of our brainwaves increases, and when we are relaxed the speed decreases. This concept is key in understanding how binaural beats work.

When the brain is in an awake and aware state it is usually operating at a frequency between 5 and 40 Hz. Within this spectrum there are a number of different states, each categorized by a frequency range.

For example, when we are in a brain state conducive to high-level cognition our dominant brainwave activity operates at around 15 to 25 Hz; this is known as the Beta state. And when in a state of deep relaxation, our

dominant brainwave activity will operate somewhere between 4 and 8 Hz; this is known as the Theta State.

The chart below shows the frequency range categories for the five major brainwave states. Please note that depending on the source, you might find some slight variation between where one brainwave category begins and another ends.



As noted in the text at the bottom of the table, not all of the benefits listed in each category range will be experienced at every frequency of that range. Different states of being will be experienced in the low, middle, and high levels of each range. Through research, specific frequencies have been identified as conducive to entraining the brain to a particular state. For example, in one particular study a frequency of 6 Hz was shown to correlate with a meditative state.

Testing the Theory

You can test the scientific theory behind binaural beats - discovered back in 1839 by Heinrich Wilhelm Dove - by visiting our How it Works page.

Scroll down the page until you come to the section that contains an audio player. Put on your headphones, press play, and listen for approximately 30 seconds.

Then, take off one of your earphones (left or right) and keep listening with the other ear. You will notice how the consistent, pulsating tone is lost when one earphone is removed. A flat tone is heard instead.

Now swap ears and try the other side. When you listen to each earphone individually, you will hear the original sound frequency (tone) being sent to that ear. When you put the other earphone back on, the brain immediately responds to the presence of both frequencies (tones) and effectively creates a third sound frequency (tone), which is the binaural beat(s).

Please note: When you take one earphone out (left or right), move it as far away from your ear as possible. If the earphone is too close, your ear will still be able to detect the tone (vibration) being emitted from the earphone. This will cause your brain to pick up on the frequency and combine it with the frequency coming from the other earphone (still in your ear), and therefore continue to create the binaural beats effect.

2.

Using The Music

Binaural beats music is used to influence the brain to move into different brainwave states. By using the appropriate track, we can use this special music to help entrain the brain to a desired mode of operation.

For example, a person suffering from stress could induce relaxation by listening to Theta wave binaural beats. Doing so would entrain the brain to produce lower frequency waves that calm the mind and leave the listener in a relaxed state.

Similarly, a person who lacks concentration and is easily distracted would benefit from listening to an Alpha binaural beats track. Doing so would move the brain into an alert but focussed state, often referred to as being in“flow”, which is a relaxed but zoned-in state of high productivity.

Another example is sleep. If a person finds it difficult to fall asleep, listening to a Delta binaural beats track before bedtime can encourage the brain to produce the low frequency brainwaves associated with deep sleep.

Results & Expectations

Our music is designed to help you access different positive states relating to mental and physical wellbeing. Over time, this entrainment creates better synchronization between brain hemispheres, and in turn improves your “whole brain functioning”.

Our music can help you achieve lower stress and anxiety levels, pain relief, better focus, improved memory, better sleep, deep meditational states, and more. For research-based evidence on the effectiveness of our music, please visit our Benefits page where we discuss a number of scientific studies.

The majority of people do feel a mental response during their first session. However, because this music is a natural therapy the results vary from person to person.

For example, it will take longer for a person who has suffered from insomnia for many years to see a sustained change in sleep quality than someone who has had a few bad nights of sleep due to stress. The latter may benefit the same night and sleep very well, whereas it may take a week or more for the former to see profound change.

What we can say is that from the moment you start listening to our music, changes in the brain begin to occur, just as they do when you first begin to exercise. With a regular listening routine (discussed later in the guide), you will enjoy noticeable, positive changes in your targeted areas of choice.

Regular use will encourage habitual behavior; whereby the brain will naturally begin to move into the desired state of its own accord during future occurrences of the same event.

For example, after two weeks of using a Delta binaural beats track before bed, you may find that you are regularly

sleeping deeper and longer and feel that you can reduce your usage or stop for a while. This same approach can be used for different areas of your life such as stress reduction, pain relief, and focus.

Best Practice Listening

Our music can be listened to in the same way as any other type of music, except that you will need headphones. The reason that you need headphones is because the brain needs to receive both tones (sent to the left and right ears) at the same time to produce the desired effect inside your auditory system.

Technically speaking, if you were sat closely between a set of speakers, with one facing your left ear and the other facing your right ear, you could listen without headphones; however, the effects would be greatly reduced. This would also be an impractical way to enjoy the experience.

That being said, many of our users also enjoy listening to our music without headphones because of its relaxing properties, so feel free to do that when you don't require the brainwave entrainment.

You can listen to our music anywhere at any time. However, for optimal results, you should listen in a way that complements the intended outcome.

For example, if you are listening to a track for relaxation, such as Chill Pill or Muscle Relaxation, it is best that you listen while sitting or lying down. You should also listen in a relaxed environment that is free of distraction. Doing so will help relax your mind and enhance the effects of the music.

Another example would be listening to Zen Focus, which is best listened to when engaged in a task that requires high-level concentration such as studying, working, or reading. Similarly, you might choose to enhance your creative flow by listening to Creativity Boost while painting or writing a book.

Binaural beats music is commonly used by meditators and those seeking states of relaxation and higher levels of consciousness; thus our brand name 'Binaural Beats Meditation'. It is therefore quite common for users to assume the traditional seated meditation position - known as the 'lotus position' - when using tracks designed for meditation and relaxation.

If you find this position uncomfortable, you can sit on a cushion or a comfortable seat instead. You can also lie down on the couch or on the floor. If you are listening to

one of our tracks designed to improve sleep quality, you can listen in bed while you fall sleep, or while relaxing elsewhere for 1-2 hours before you go to bed.

However you decide to listen to the music, the general rule of thumb is to make sure that you are as comfortable as possible, and that you engaged in a way that complements the desired outcome.

3.

Choosing Your Headphones

The large majority of headphone types will be good enough to listen to and benefit from our music. For example, the standard earbuds you get with your phone or mp3 player - like those pictured below - will work just fine.

However, if you are using our music on a regular basis, you might want to invest in some better quality headphones to get the most out of your listening experience.

Open Vs. Closed-Back Headphones

For optimal listening, we recommend using closed-back headphones.

If you aren't aware of the difference between closed-back and open-back headphones, here is a short explanation:

Closed headphones have a sealed cup, whereas open headphones are "open" behind the driver. This means that closed-back headphones will stop you hearing outside sounds, and stop sound leaking from your headphones into the earshot of others.

In short, closed headphones tend to give you a more "in head" soundstage, which is great for listening to ambient-style music like ours.

Budget models of closed-back headphones, despite having a sealed cup, may have an inferior sound that produces reflections and resonances. To be on the safe side, it is best to choose headphones from a brand name such as Bose, Sennheiser, Beyerdynamic, AKG, or Sony.

Amazon.com regularly has deals on affordable, good quality closed-back headphones. We have also written a detailed post on our blog on this subject to help you choose the right headphones for your budget. Read that post here.

Noise-Cancelling & Wireless Headphones

Both noise-cancelling and wireless headphones are generally fine to use with our music. The intention of noise-cancelling headphones is to cancel out external sound, not to interfere with the music. This means that the binaural beats frequencies underneath the music will be unaffected by the noise cancellation .

There are two main types of wireless headphones used to listen to music. The first are those that use a radio frequency transmitter – a type of aerial box that transmits the signal to your headphones. Such headphones tend to be used with home stereo systems because the signal has a long range and is able to pass through walls.

The second, and most common form of wireless headphones, are those that use a Bluetooth signal. At one time Bluetooth was considered low quality because it applied heavy compression to the sound. However, the technology has evolved and newer versions of Bluetooth headphones are capable of producing high quality playback. You can rest assured that all popular brands of wireless headphones will work well with our music.

Setting the Volume

When listening to our music, set the volume at a comfortable level. You don't want the music to be too loud, but at the same time you don't want the music to be so low that you are easily distracted by external sounds.

Note that increasing the volume higher than a comfortable level does not enhance the effect of the music. As long as the music is audible through headphones the desired state can be achieved.

Some of our tracks may appear to be slightly lower in volume than others, but this is generally due to the ear's perception of the sound design rather than the actual volume of the track.

The sound design also dictates the prominence of the binaural beats frequency track (the tone/hum sound underneath the music), which you may or may not be able to hear, depending on the track. Simply adjust the volume to a level you are comfortable with on track by track basis.

4.

Your Listening Routine

Recommended Usage Limits

We recommend starting with three tracks per day. You can use either the 30 or 60-minute versions.

If there's a particular track you want to focus on, you can listen to it more than once a day. You can also loop a track twice or three times over, but please be mindful of excessive headphone use and take breaks between sessions.

We recommend that you do not use Beta and Gamma state tracks in the evening. These are high-frequency tracks that stimulate wakefulness, as opposed to Theta and Delta state tracks which promote the production of lower frequency brainwaves and, generally speaking, a relaxed state of mind. You can find out which frequency range a particular product uses by navigating to the relevant product page description on our website.

Developing a Routine

We recommend developing a listening routine based around the goals that you are targeting. For example, you might listen to Positive Thinking in the morning to set you up for the day with a positive mindset, and then Zen Focus for high-level productivity while you are working, and then Chill Pill when you get home in the evening to de-stress.

Once you see positive change in a particular area, you can choose to move on and try a different track for a different purpose. For example, if you have been starting your day with

Positive Thinking for two weeks in a row, you might choose to change your routine and start the day with Abundance Meditation.

It is a good idea to adapt your listening routine to suit your current situation and desired outcomes. For example, perhaps you are interviewing for a new job and you want to make sure that you get a good night's sleep before the big day, or you want to reduce symptoms of anxiety before the interview. In this case you might choose to use Blissful Sleep the night before, and Anxiety Release on the morning of the interview.

5.

Next Steps & Helpful Links

We hope that you have found our guide interesting and that you are now ready to join hundreds of thousands of other users already benefiting from our special music.

If you have a question that wasn't answered in this guide, please have a read over our User FAQ. Alternatively, you can contact us by email using the form on the contact page.

If you have a question about our subliminal audio products, which use a combination of binaural beats and subliminal messaging, please have a read over the Subliminal Audio FAQ.

To choose your downloads and get started now, you can visit our store by clicking here.

We hope that you thoroughly enjoy our music, and we look forward to hearing from you soon.

Disclaimer:

While our programs contribute to wellness, they are not intended to replace medical diagnosis and treatment. If you have a history of seizures, auditory disorders, a heart condition, or other adverse mental condition(s), or you are pregnant, or under the age of 18, do not listen to our music without first consulting your physician. Do not listen to our music while driving or operating heavy equipment. In the unlikely event that you experience any unusual physical or mental discomfort, discontinue use immediately. All claims whether expressed or implied, including merchantability and fitness for a particular purpose are disclaimed.