

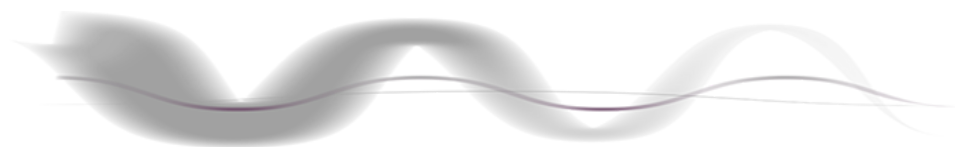
Illustration: Heather Tyler

*Is "sound healing" based on sound science, or is it just a bunch of noise? **Lisa Marie Potter** uses her brain to find out. Illustrated by **Heather Tyler**.*

Just minutes after I remove my boots inside the entrance of the Globe Institute of Sound and Consciousness in San Francisco, founder David Gibson asks whether I'd like to experience the sound table.

"Absolutely," I say. Gibson leads me past knee-high crystal bowls and U-shaped tuning forks into a warm, candlelit back room. I lie on the table's amethyst mattress and gaze at the mandala designs on the ceiling fabric. Ambient music fills the space: wind chimes, waves, a string quartet. Then, subwoofers start vibrating bass rhythms into my toes, thighs, back, shoulders and head. As the music builds, the pulses intensify—and I begin to relax.

After six minutes, the music fades and the vibrations stop. My body and mind are buzzing. "You feel totally blissed out?" Gibson says, grinning, and I have to say yes. But what, if anything, just happened to my body—and, more importantly, to my brain?



Gibson, a musician, sound engineer and director of the [Globe Institute](#), has explored how sounds affect a person's physical, mental, emotional and spiritual state for more than 15 years. By using certain sound frequencies, "sound healers" contend they can influence our

Stories

[Smoke in the Valley](#)
[Edges of Extinction](#)
[Call of the beachmaster](#)
[heard it from a bird](#)
[Condors in Purgatory](#)
[Sea Stars go Viral](#)
[Wild West Nile](#)
[Just Within Reach](#)
[Power house](#)
[Cerebral Vibrations](#)

Podcasts

[Past Issues](#)

[Home](#)

[Contact Us](#)

[Editorial Staff](#)

[About the Science Writing Program](#)

[About the Science illustration Program](#)

[ucsc home page](#)

[csu Monterey bay home page](#)

brainwaves. This manipulation, they say, alters consciousness to help treat myriad ailments, including insomnia, anxiety, depression and Parkinson's disease. Testimonials on the institute's website, which thrums soothingly, assure prospective customers that sound treatments do reduce symptoms from these conditions—and **myriad research provides evidence**, Gibson says.

Some neuroscientists are indeed exploring whether influencing brainwaves can treat similar disorders. But while researchers do not dismiss the Globe Institute's methods outright, they're highly skeptical. Few clinical studies with rigorous controls back up the claims, they note.

Still, immersing ourselves in sound makes us feel different. . . somehow. With my vibes still lingering, I resolved to find out why.

Living in surround sound

Outside the Globe Institute, taxi horns and jackhammers fill San Francisco's booming South of Market district with constant sound. The cacophony vanishes inside the doors, where students can pursue master's and certificate programs in sound healing. The institute's **Sound Therapy Center** hosts private sessions to treat ailments of the body, mind and spirit—with hourly rates listed for each service.

The sound table that vibrated me is the nexus of the institute's "vibroacoustic therapy." This immersion is one of the institute's cheaper options, at \$40 per half hour. The website claims the sound bath can decrease blood pressure and lower heart rate. Music bombards the brain with beats that, according to the therapists, slow down brainwaves to help with anxiety. The institute also works with people suffering symptoms from Parkinson's disease. Testimonials from clients say the sounds reduce their reliance on medication and decrease their tremors, at least for a couple of days.

The site features a disclaimer: Globe Institute personnel can reduce stress and help clients relax, but they do not diagnose or treat disease. Although my six minutes on the sound table did indeed relax me, sound healers make bold claims about manipulating the brain and sparking physical changes as a result. Yet bona fide neuroscientists are just beginning to explore this terrain; they don't yet know which brain rhythms are linked with which cognitive functions, and how those links actually work.

My first experience with sound therapy occurs at the institute's monthly open house. Everything in the universe vibrates at its own frequency and interacts physically with sound, Gibson tells a dozen of us at the free event. "When you learn the laws of physics about how one vibration affects another, then you're empowered to change your world or get more in alignment with the flow of the natural vibrational world itself." But sounds can do more than align us, Gibson tells the group. They can heal us, too.

We navigate through an ocean of air that gets perturbed when something vibrates, sending invisible ripples cascading in all directions: sound waves. The number of times a sound wave repeats in one second is its frequency. The higher the frequency, the higher the pitch. Sound waves hit the outer ear and vibrate the eardrum. The vibrations travel into the inner

ear, bending tiny hair cells that ignite a chain reaction of electric pulses across networks of neurons. Our brain perceives these as sound.

Sound healers claim that

by adjusting these frequencies, they can influence changes in consciousness.

Consciousness is the mind's awareness of the world, which varies throughout the day.

During sleep, we dream; while reading, we focus;

and while waiting for the bus, we stare at smart

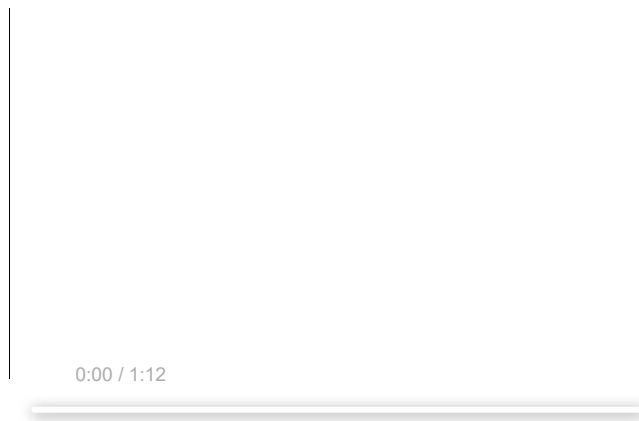
phones. Devices that

monitor the electrical signals rifling among our neurons show shifting patterns of brain activity—a complex command center coordinating the regions of the brain that control sight, sound, movement and thought.

By attaching electrodes onto someone's scalp, neuroscientists can see these light shows flicker across the geography of the brain. Imagine flipping the switch for a Christmas tree with independent strings of lights. The bulbs in each string pulse in synchrony, but each strand blinks at its own rate. In a similar way, our brain communicates by sending messages via electrical signals from one brain cell to the next. These create large-scale networks of neurons that activate and make new connections across regions of the brain. At times, each of these networks can pulse with its own rhythm, like the tree's lights.

“New brain imaging technology has provided evidence that different circuits of the brain have preferred frequencies at which they oscillate,” says cognitive neuroscientist **Petr Janata** of University of California, Davis, who uses music to understand how the brain organizes human behaviors. From highest to lowest frequencies, these "brainwave oscillation bands" are called gamma, beta, alpha, theta and delta waves.

Since discovering these oscillations in 1929, neuroscientists have struggled to understand whether each band's frequency corresponds to a cognitive or psychological state. Yet sound healers confidently contend that they relate to a person's level of consciousness, **citing studies** that associate sound with reduced anxiety and **sharper performance**. “Delta is good to help you go to sleep or for deep meditation, and theta is a realm state,” Gibson tells me in his sunlit office. Sound healers believe they can coax neuron

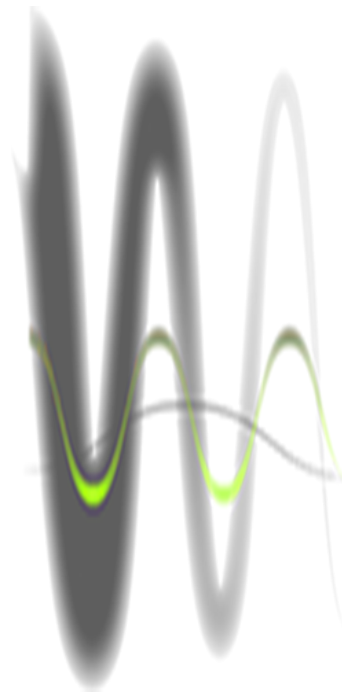


Lisa Marie Potter follows a sound wave step-by-step from a tuning fork into our brain.

networks into particular rhythms by playing matching external sounds in a process called entrainment.

This is your brain on sound

At the open house, Gibson sits at the center of our circle and demonstrates ways to entrain brainwaves. He kneels amidst an array of music-makers: large crystal and metal bowls, tuning forks, and exotic drums. He strikes the edge of a crystal bowl and traces its rim to sustain the tone, just as dragging your finger around a wine glass makes it sing. After a moment, the bowl produces an ethereal "wah-wah-wah." The bowl's frequencies, measured in cycles per second, or hertz (Hz), will influence the listener's own brainwaves to pulse at the same rhythm, Gibson tells the group.



There is some evidence that entrainment is real, says neuroscientist **Brian Pasley** of UC Berkeley. Pasley **published a study in 2012** that decoded the brain's electrical activity as it listens to speech. The brain breaks down sound into component frequencies within different neural regions, says Pasley. "If you look at a particular spot in the auditory cortex, the neurons there. . . [are] tuned to particular tones," he says. In the same way, Pasley confirms, an external sound, such as a tuning fork that vibrates at the pitch of middle C, could entrain the neurons responsible for encoding sound to pulse at that same oscillation frequency.

Yet neuroscientists disagree about what the brain rhythms mean. It's not as clear-cut as sound therapists claim, Pasley warns. "The brain signals themselves—it's actually not well known exactly what different frequencies of activity do," he says. "Some people think they don't even do anything."



SciCom Slugs

Is there any science behind "sound healing?"

SOUNDCLOUD

Share



5:23

[Cookie policy](#)

Podcast produced by **Lisa Marie Potter**. [Click on image to play.](#)

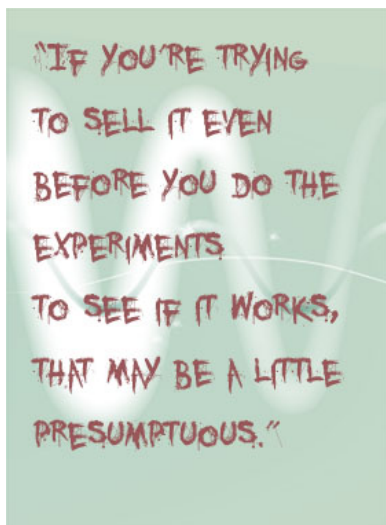
Some researchers have used brain imaging to link certain oscillation bands to specific cognitive functions. The alpha frequency is an important rhythm for perception and attention, says neuroscientist **Gregor Thut** of the University of Glasgow, U.K. His work is part of a growing field in which scientists try to modify brainwave oscillations to alter the brain's function. But unlike the sound-driven entrainment at the Globe Institute, Thut and others apply electrodes onto the patient's cranium and deliver electromagnetic pulses to the

neurons. That has shown that when the pulses entrain the attention center of the brain, they can influence the person's behavior.

Entrainment works, Thut says, because an external stimulus synchronizes the surrounding neural networks. He thinks of it like influencing pendulum swings. "With swings, you can help [amplify the] swinging if you push at the correct moments," he says. Most of the entrainment stops when you remove the external stimulus, he notes, because the internal brain rhythms take over again. And despite the therapeutic reassurances made by Globe Institute's staff, Thut says, the field of neuroscience is just beginning to explore whether brain rhythm interventions could be used as therapy: "These are very early days."

Two, two, two beats in one

Sound healers often use rhythms called "binaural beats" embedded within soothing, relaxing music to try to entrain a client's brain. **Binaural beats** form when two tones at slightly different frequencies play at the same time. In headphones with the right ear tuned to 1,000 Hz and the left tuned to 1,010 Hz, we can't hear the distinction. But as the sounds move through our auditory neural pathways, the brain perceives an underlying beat at a low frequency of 10 Hz—the difference between the two tones. Sound healers engineer binaural beats to trigger specific frequencies that **influence desired states of consciousness**, according to research cited by the institute.



Neuroscientists understand the binaural beat phenomenon, says **Theodore Zanto** of UC San Francisco, who studies how our perception of rhythm relates to memory and attention. Devices that monitor brainwaves detect binaural beats entrained in the neurons of the brain stem, Zanto says. Sound healers take it a step further to link the frequency of the binaural beat to mood or cognition. But that leap lacks convincing research to back it up, says Zanto. He could find no studies linking binaural beats to healing that adequately controlled for other factors that might explain the benefits to

patients, such as the soothing music itself or a placebo effect.

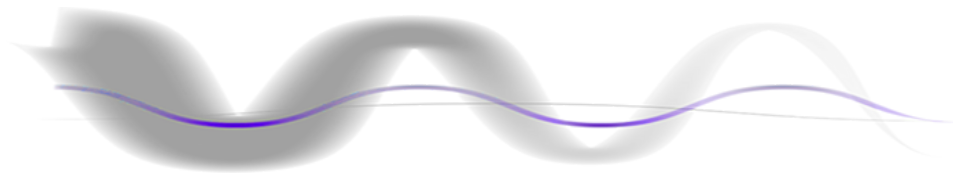
"I don't want to completely take it off the table as a possibility, but I'm really skeptical," Zanto says. Without controlled experiments, he says, there's no evidence that your elevated mood after a sound therapy session comes from binaural beats doing something in your brain. "These things really need to be teased apart and controlled properly to fully say that there is something special about sound healing," he says.

Still, Gibson says his clients have had amazing results from the institute's sound healing sessions. "I mean, I've had people be in tears," he says, leaning over his desk to describe success stories from his customers. Some patients have shed their fibromyalgia, he maintains, and about ten clients say they no longer have ADD [Attention Deficit Disorder].

“I’ve seen, in myself and in hundreds of people, where chronic pains are gone [after sound therapy sessions], forever. I mean it’s just unbelievable.”

Indeed, it seems unbelievable. Yet I can’t deny that sound healing sessions make me feel *something*. At the institute, I lie on the floor with my eyes closed when someone strikes a Tibetan bowl with a hard gong. A deep wah-wah-wah wafts through the room. When the last note fades I hold onto the silence with intense focus. I feel buzzed—almost high. This is the closest I’ve come to meditating, a practice that neuroscience research has shown to improve mood and cognitive function.

Could meditation contribute to the sound healing success stories? Did sound frequencies help me meditate? Controlled studies do provide convincing evidence about the positive effects of meditation on the brain, says psychologist [Michael Posner](#) of the University of Oregon. Posner’s research has shown that meditation can decrease hormones associated with stress and increase the efficiency of connections between neural areas.



“There’s pretty good evidence that frontal theta [brainwave rhythm] is produced by meditation,” says Posner, so he sees a certain logic trying to entrain such rhythms to induce a meditative state. But so far, he says, there’s no evidence that playing external theta rhythms will prompt the brain to reproduce the benefits of actual meditation. “I don’t think it’s a crazy idea; you just have to do the experiments to see if it works,” he says. “But if you’re trying to sell it even before you do the experiments to see if it works, that may be a little presumptuous.”

Gibson also has worked with a dozen patients with Parkinson’s disease. A combination of techniques tamps down their tremors, he states. The patients sit on a vibrating sound chair, which rotates to activate responses in the heart rate while playing music embedded with binaural beats. Gibson designs the music with several tailored features, including specific frequencies, types of sounds and harmonic intervals. Gibson saw his clients’ symptoms improve, he says. He also points to [NIH-funded research](#) that examined vibroacoustic music as a way to alleviate certain symptoms. Why does it work? “It’s hard to say,” says Gibson, “because we haven’t really done the science to break it out.”

Here, science soon may have some answers. Parkinson’s disease affects the neurons that maintain the internal timing needed to control our arms and legs smoothly. Neuroscientist [Jessica Grahn](#) of the University of Western Ontario studies how music and rhythm can entrain muscles, providing external timing to help the brain compensate. Her research adds to growing evidence for music as a therapy for Parkinson’s symptoms.

“Even when you’re passively listening to a rhythm, you’re engaging motor networks,” says Zanto of UC San Francisco. “And so in the context of Parkinson’s disease, it’s not incredibly surprising that music therapy helps them, because the music is effectively engaging the motor system.”

My experiences at the Globe Institute led me to dwell upon our history with sound. From the drumming of our African ancestors to the chanting of Tibetan monks to the latest breakup song by Taylor Swift, our species has sought to self-medicate with vibrations for millennia. Those who seek out sound healers feel better after their sessions, even if healers go far beyond what neuroscientists would ever say about the effects on brainwaves. And the sound therapists, in turn, feel good that so many customers are seeking them out.

© 2015 Lisa Marie Potter, UC Santa Cruz Science Communication Program

[Top](#)

Biographies

Lisa Marie Potter

B.A. (Earth science, Spanish) San Francisco State University

M.S. (biology) San Francisco State University

Internship: UC San Francisco news office



In high school, my view of science was covered by a paper bag and published by McGraw-Hill. I couldn't see the forest for the boring text about the trees. Instead, the ocean taught me to marvel at nature. I watched the horizon bend into swells, saw fog layers come and go, and splashed in fluorescent green water during red tides. The ocean put it in terms I understood: Dude, science is rad!

While studying Earth science in college, I was fascinated by the interconnection between the atmosphere, geosphere, hydrosphere and biosphere. I was also struck that people feel a disconnect between humans and the natural world, as if we live in an isolated anthrosphere. By telling stories that weave together humans and nature, I hope to encourage us to reconnect—in terms everyone can understand.

[Lisa Marie Potter's website](#)

.....

Heather Tyler

B.S. (marine biology) University of California, Santa Cruz

Internships: Long Marine Laboratory, Santa Cruz; National Museum of Natural History

Heather grew up in Santa Cruz. Inspired by the natural beauty and fascinating ecosystems there, she has always strived to be involved with biological research. She spent her time in college and following years exploring the fields of marine science and zoology, from marine mammal training and coral reef research to veterinary work and wildlife rehabilitation. Now, as a scientific illustrator, she loves being able to continue contributing to the scientific community by promoting biological conservation.

[Heather Tyler's website](#)