YOGA RESEARCH
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Sound Health

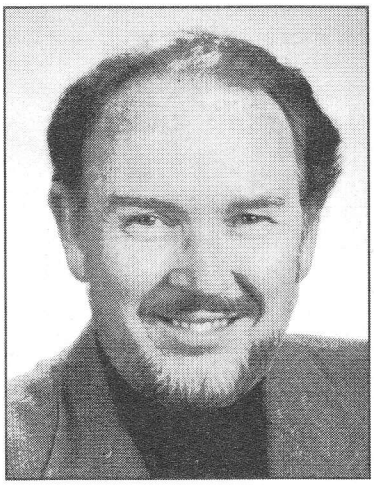
excerpted from **The Mozart Effect** by Don Campbell

The word *health* comes from Old English *hal*, a root word signifying whole, healing, hale, and inhaling. *Heal*, in Northern Middle English, means "to make sound," to become healthy again. We use the word *sound* – a synonym for health and wholeness – to signify basic vitality and the unshakable foundation for whatever we do.

Thus we speak of sound judgment, sound advice, sound investments, etc. When things are going smoothly, we are *in tune* and *in harmony* with others and the world around us. When things are stuck, we are *out of tune* and *out of sync*. In romance or relationships of any kind, we hope to *set the right tone*, *strike a sympathetic chord*, or *communicate on the same wavelength*. When the unexpected happens, we decide to *play it by ear*. We admire the executive who can *orchestrate a deal* and cheer the team that can administer the opposition a *sound beating*. We strive to assert our identity as strong, independent *persons*, train ourselves to develop our *personalities*, and carefully construct our *persona* our public mask – all from the Greek roots *per son*, or "the sound passes through." Although we may not see ourselves as particularly musical, music metaphors and sonic imagery permeate our lives.

Sound travels in waves through the air and is measured in frequencies and in intensities. *Frequency* refers to pitch, the high or low quality of sounds, and is measured in *hertz*, the number of cycles per second at which the wave vibrates. The higher the pitch, the faster the vibration, the lower the pitch, the slower. On a piano, for instance, the lowest key registers at 27.5 hertz and the highest at 4,186 hertz. A normal ear can detect sounds ranging from 16 to 20,000 hertz. Thresholds of hearing can vary from culture to culture and environment to environment. In Africa, the Maabans live in such tranquility that they can hear a whisper from more than 90 feet away.

Over the last half century, Dr. Alfred Tomatis, a French physician, has devoted his life to understanding the ear and the many dimensions of listening. To his associates, he is the Einstein of sound. Tomatis believes that high-frequency sounds (3,000 to 8,000 hertz or more) generally resonate in the brain and affect cognitive functions such as thinking,



spatial perception, and memory. Middle frequency sounds (750 to 3,000 hertz), he says, tend to stimulate the heart and lungs and the emotions. Low sounds (125 to 750 hertz) affect physical movement. A low drone tends to make us groggy; a low, fast rhythm, on the other hand, makes it difficult to concentrate or be still.

Intensity, or loudness, is measured in *decibels* (named after Alexander Graham Bell, the inventor of the telephone). The rustle of leaves registers at 10 decibels, a whisper at 30, a normal conversation at about 60, a jackhammer at about 100, a rocket launch reaches 180 decibels. The decibel scale is logarithmic, so that each 10 decibels increment is double the previous number. The ratio of intensity between the faintest and loudest sound the human ear can hear is a trillion to one.

Another major characteristic of sound is its *timbre* – the quality of a voice or instrument that distinguishes it from others. A Stradivarius violin, for example, has a clear, warm, soulful timbre.

Imagine what effect sounds can have on delicate cells, tissues and organs. Vibrating sounds form patterns and create energy fields of resonance and movement in the surrounding space. We absorb these energies, and they subtly alter our breath, pulse, blood pressure, muscle tension, skin temperature, and other internal rhythms.

As the right and left hemispheres of the brain operate differently, so do each of our ears. I began to notice this while helping to review, in cooperation with the Sound Listening Center in Phoenix, Arizona, hundreds of listening evaluations of people in a four-month study measuring the ability to discriminate between sounds at different pitches through air and bone conduction.

When clear and bright vowel sounds were received through the right ear, the listener's voice often grew stronger, his or her posture became more erect, and stress was reduced, whereas the same sound directed into the left ear would sometimes distort the listener's pitch and cause less attentiveness. However, the left ear perceived emotions and lower tones just as well as the right ear.

The right ear is dominant because it relays auditory impulses more quickly to the speech centers in the brain than does the left ear. Nerve impulses from the right ear travel directly to the left brain, where the speech centers are located, whereas nerve impulses from the left ear make a longer journey through the right brain, which does not have corresponding speech centers, and then back to the left brain.

The ear choreographs the body's dance of balance, rhythm, and movement. The ear is the gyroscope, the orchestra conductor of the entire nervous system. Through the medulla, or brainstem, the auditory nerve connects with all the muscles of the body. The ear's vestibular function influences

Yoga Research Society
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Of words, I am the one syllable "OM"
Śrīmad Bhagavad Gītā

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For Information
(215) 592-YOGA (9642)
yogasearch@aol.com

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the eye muscles, affecting vision and facial movements, and also chewing and taste. Through the vagus nerve, the inner ear connects with the larynx, heart, lungs, stomach, liver, bladder, kidneys, and small and large intestines.

Tomatis views the ear as the key organ in humanity's development of a vertical posture. Sitting or standing upright, with the head, neck, and spine erect, allows maximum control over the listening process, and stimulates the brain to full consciousness. It enables the entire body to become, in Tomatis's words, "a receptive antenna vibrating in unison with the sound source, whether it be musical or linguistic."

Brain waves can be modified by both music and self-generated sounds. Ordinary consciousness consists of *beta waves*, which vibrate from 14 to 20 hertz. Heightened awareness and calm are characterized by *alpha waves*, which cycle from 8 to 13 hertz. Like meditation, yoga, biofeedback, and other practices designed to unify mind and body, music with a pulse of about 60 beats per minute can shift consciousness from beta toward the alpha range, enhancing alertness and general well-being.

Breathing is rhythmic. By listening to music with longer, slower sounds, one can usually deepen and slow the breath, allowing the mind to calm down. The heart rate also responds to musical variables and tends to speed up or slow down to match the rhythm. Anesthesiologists report that the level of stress hormones in the blood declines significantly in those listening to relaxing, ambient music.

"When I hear music, I fear no danger.
I am invulnerable. I see no foe.
I am related to the earliest times,
and to the latest."
— THOREAU, *JOURNAL*, 1857

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