

Sports Music: Your Brain & Athletic Body

William Katovsky interviews Dr. Phil Maffetone

Dr. Phil Maffetone considers songwriting as "one of the most powerful of all my life's wonderful experiences." It was this creative exposure to music's influence that led him to begin looking more closely into the relationship between music and the brain. "Over 5,000 years ago, Chinese medicine included music as a therapy, along with other remedies," says Dr. Phil, who began studying music therapy over 30 years ago. Currently, one of the hottest fields in medical science is research into the brain -- how it functions, what is consciousness and memory, biofeedback, behavior modification and prediction, and physical self-repair. Music plays a key role in brain research and injury treatment. For athletes, this can be a godsend. Because being in the right mental state while listening to music can affect one's brain waves, which, in turn, can improve one's overall health.

The following exchange is taken from a series of recent conversations I had with Dr. Phil on the subject of music, the brain, fitness and health. He currently lives in Arizona, where he often performs the music he writes in local clubs and restaurants with Coralee Thompson, also a holistic physician, as the musical duo, ONE! Phil says he's in the best shape of his life; he swims, bikes, and hikes almost every day. His website is www.philmaffetone.com where you can download many of his songs, health articles and other items for free.

Q: I'd like to begin with this anecdote from Dr. Oliver Sacks' new book, *Musicophilia*, which investigates the profound relationship between music and the mind. In one passage, the well-known neurologist describes how he hurt his leg while mountain climbing and was able to get down the mountain before nightfall by singing "The Old Volga Boatman." He said that he "musicked along" and its rhythms and melodies made his mind forget pain. Later, in the hospital, he repeatedly listened to a cassette of a Mendelssohn violin concerto. Then, after weeks of struggling to walk, he stood and found that "the concerto started to play itself with intense vividness in my mind. In this moment, the natural rhythm and melody of walking came back to me ... and along with this [came] the feeling of my leg as alive, as part of me once again." What do you make of Dr. Sacks' claim about the healing powers of music?

Phil Maffetone: It's great, and there are so many stories like the ones he portrays. The body's response to an injury includes a stress reaction, but often, before an injury, there's also pre-existing stress. And stress itself may contribute to or actually cause the injury. In either situation, the related high levels of stress hormones can interfere with our repair and recovery. Music can help reduce stress hormones, allowing the healing process to proceed more effectively, and quickly. Music also helps coordinate the brain and muscle memory. Think about the power of music and muscle memory in complicated dance routines. Visualization is a practical application of this for any athlete. Listening to music while envisioning a successful workout, or especially a great race, is a wonderful way to add more training without adding miles. I've worked with many people who had serious muscle problems and found that through biofeedback -- between and muscle and brain -- normal function can be restored even in those with strokes, spinal problems and brain injuries.

Q: I read in Vanity Fair magazine that you worked with Johnny Cash towards the end of his life when he was gravely ill.

PM: Johnny asked me for help in restoring as much health as possible and bring back life to a man who still had a mission -- to play and record more music. My approach included treating him like an athlete. However, for me, the task would be quite difficult. This was not because he was so frail but because Johnny was regularly taking more than 30 prescriptions, and at the time of his death, that number had increased to more than 40. This was clearly a problem of over prescribing, one common in the elderly.

When I first saw Johnny, at age 71, he was relegated to invalid status. He had been sent a wheelchair, given leg braces, and prescribed special shoes that cost thousands of dollars even though he couldn't walk. In addition to the obvious difficulty this posed on a man who had been extremely active, it was restricting him from regaining any part of his health, and as he said to me more than once, it was even embarrassing. Together, we devised a strategy to improve his diet, stimulate his physical and mental capacities, and set goals, one of which was to record another CD.

The first day of therapy with Johnny yielded a few unsteady but pain-free steps. I utilized what I call "manual biofeedback" and other techniques that I've employed during my 25 years of practicing complementary medicine. Within two more days, he was able to take upwards of 100 steps. More improvements came in the following weeks. Performing these exercises barefoot was part of my approach and something Johnny liked. As he was able to venture outdoors, he wore a comfortable \$7 pair of flat sandals, which replaced his expensive, embarrassing footwear.

Other therapy included sitting outside, a place he previously would only go when he had to go to a hospital or dentist, for some healthy sunrises, riding a stationary bicycle, and eventually walking up and down steps. I also "assigned" him music therapy -- which he joyfully agreed -- to help restore other lost function in his vision and writing. Among other things, this resulted in him writing the first song in a long time, and sadly, what would be his last.

Q: So what exactly happens with our brain on music? What is the difference between listening to Sex Pistols or Nine Inch Nails and a Brahms concerto or Tori Amos?

PM: When we listen to music, the brain focuses on all the sounds, which in turn, affect other brain areas. The more sounds, the more involved the brain becomes. In a piece of music with just a guitar and vocal, like a simple folk song, the brain still "lights up" all over; lyrics may trigger all kinds of memories, melodies affect other brain areas, bass notes can awaken still other brain regions, and so on. A social injustice song will get the brain working more than simple nonsense lyrics. Listen to a full symphony orchestra playing some complex piece of music, and the number of sounds going into the brain, and its response, may be enormous.

Q: Describe the different types of brain waves and their functions.

PM: There are four commonly measured waves that reflect different levels of consciousness: beta waves are seen in a busy brain, such as during a business meeting, planning a trip, doing taxes; alpha waves are evident in a creative, relaxing, happy state; theta waves are seen in pre-sleep and are also associated with creativity; and delta waves are associated with deep sleep. Brain dysfunction can occur

when certain waves appear at the wrong time. For example, delta waves that appear while reading or balancing your checkbook are abnormal and a reason for mistakes and poor comprehension. The inability to produce alpha waves is also abnormal. Blood sugar problems, inadequate sleep, nutritional imbalance and even structural problems, such as those in the jaw joint or neck muscles can affect the brain and impair the ability to produce alpha waves.

Q: Talk more about alpha waves.

PM: The ability to produce alpha waves is associated with an overall healthy brain and body. And, alpha waves are associated with self-regulation of stress. It is one reason people have, for thousands of years, pursued meditation or prayer. Specifically, alpha waves can reduce high levels of the stress hormone cortisol, and help balance the nervous system, reducing unwanted stress in the body. This can be especially important for athletes whose busy workout schedules may require more repair and recovery. These alpha waves can have dramatic effects on our whole body, such as improved memory, learning and comprehension, better blood sugar regulation, improved gut function, and balanced hormones. When we're relaxed, creative, meditating and happy, our brain produces large amounts of alpha waves. In this alpha state, our stress hormones are reduced.

Q: How does this impact athletes?

PM: Brain waves reflect our level of consciousness. If an athlete is not in a good or positive state during training or racing, reduced function and even injuries can occur more easily. Thinking of all your problems during a long bike ride can make you more stressed. But if your long bike ride gets your brain drifting into another state of mind, you can literally ride away from your stresses and get a better workout -- both mentally and physically.

Q: So there is a positive biofeedback aspect to music?

PM: Yes, in many ways. Music therapy is very similar to heart-rate monitoring; it's another form of biofeedback. You listen, and your body responds. But my approach to brain biofeedback is very simple. No need for a series of expensive biofeedback sessions, no courses to take, no videos to watch. You just need to actively listen to music. In fact, this is cutting-edge scientific material that's making its way into mainstream health care. The brain-muscle connection has been known about for years. EMG (electromyographic) biofeedback, which is used to train the brain to make the body work better, has been in use in medicine since the 1960s. Some of the benefits obtained with these methods include improved muscle contraction, muscle relaxation and even improvements in muscle power. All these and other factors help prevent and treat injuries, and improve performance.

Q: Can you suggest something specific for athletes to use on a regular basis?

PM: Yes, there is something I developed called the 5-Minute Power Break and is a proven way to turn on the body's powerful alpha waves. It refreshes and energizes you by controlling stress. It can improve blood supply to the brain (which regulates our exercise activities), improves oxygenation, and balances the nervous system. Here's all you have to do: 1) Sit or lie down, and get comfortable; 2) Close your eyes; 3) Place hands or crossed arms relaxed on your upper abdomen; 4) Breathe slowly -- inhale 5-7 seconds and exhale for the same (deeply but don't force it); 5) Listen to alpha-generating music

you enjoy -- my website (www.philmaffetone.com) plays "Rosemary" which is very effective. Using headphones is even better. Do this twice daily for only 5 minutes as needed, or more as you can't overdo it. Try it before a race, workout, during the day, or any time you need a mental pickup. Even if you're not an athlete it's a great stress-reducing technique. If you start falling asleep it means you're no longer in an alpha state but drifting into delta (the sleep wave), which may be indicative of a sleep disorder. This is typical of those with sleep apnea, a serious and common health problem. In this case, five minutes is too long -- stop before drifting off. Even one or two minutes of alpha is a healthy break. You can gradually work up to five minutes as your brain learns to stay in alpha. The 5-Minute Power Break is highlighted on my website.

Visualization has long been an effective technique in sports, and is associated with improving certain brain areas such as the cerebellum which is our internal metronome. Athletes can improve their physical performance by improving the cerebellum with music. Imagine doing marching exercises (something used in treating various brain disorders) -- this connects the metronome and auditory areas of the brain with the muscle movement centers. This stimulation can improve the economy or efficiency of our movement, including running, biking and swimming, improving efficiency. And it can save energy, reduce wear and tear, and even increase speed (at the same heart rate). Even activities such as golf, tennis, and martial arts can be significantly improved with this approach. Non-athletes can benefit from this too, which is really what I did with Johnny Cash; I treated him like an athlete employing music as a therapy. As he improved, his own musical energy came to life too.

Q: Which songs produce the best therapeutic response?

PM: That depends on you and your circumstances. I could name hundreds. But first let me explain something important here. Music can rev you up as easily as it can relax you. So one key is picking the songs most appropriate for what you want. Most athletes need recovery, so soothing music may be best. Sometimes, it's how we listen as much as what we listen to. When hearing high-energy songs that get us moving, it's often the drums that affects our nervous system and rev us up. The melody (in songs with words, it's the part that's sung) is what most people remember about a song, and can be a powerful therapy. Or listen for things you may not have heard before, such as one of the background instruments like a subtle piano or acoustic guitar.

Often, those who don't respond to music can't take their mind off everything else around them when the music's playing. Try a good pair of headphones (especially the noise-cancellation types) and close your eyes. In this state, the brain doesn't have to listen to anything except the music, and there are no distractions from visual stimuli, which turns on more of the brain than anything else. This gives the brain more "energy" for focusing on the music, and often in this state you can hear things you may never have heard before, despite hearing that song many times before.

So which songs would I suggest? Ask me this question tomorrow and I'll have a different list. Virtually any Beatles song will work well. I've used "Day Tripper" in measuring brain waves with patients. But pick something you may be less familiar with, such as "For No One" (Revolver). Most classical music works exceptionally well too. Mozart is great, but experiment; there is almost an endless supply. Some great pop picks include: "Chelsea Morning" by Joni Mitchell; "Heart of Gold" by Neil Young; "Hey" by Red Hot Chili Peppers; "Hallelujah" by Leonard Cohen; "San Diego Serenade" by Tom Waits; "Time of No Reply" by Nick Drake.

Q: Can listening to the right kind of music actually lessen pre-race jitters? Is this like doing meditation?

PM: It could be better than meditation because many people can't meditate successfully. It takes some training to do that. Music, on the other hand, is there, front and center, especially when you wear headphones and close your eyes.

Q: So you have achieved this peaceful, Zen-like alpha state before going out on a training run or ride, and within several minutes a car nearly runs you off the road. You become angry and unsettled. How is it possible to calm down afterwards?

PM: One goal of biofeedback, like meditation, is to have better control of our brain. We should be able to switch back to an alpha state, as easily as shifting gears on the bike, if we're thrown into a beta state by some jerk in a car. At the same time, we don't want to get so "far out" that we're unaware of our surroundings. In reality, the brain is often shifting its state of consciousness. For the same reason we don't want to ride our bike with our iPod, we don't want to be stuck in the same mental state. Staying in alpha all the time can result in getting lost even on a familiar course, or worse, risking a crash.

Q: Some will say, as one critic argued, "music has a way of eluding the neuroscientists' tools and schemas," and that trying to get an absolute firm fix on music's effect is entirely speculative -- it lacks hard science to back up certain claims.

PM: Music does not elude scientists any more than exercise physiology or nutrition eludes them. We know a lot about all these and other subjects relating to human function. In fact, Greenwich Hospital in Greenwich, Connecticut, Beth Israel Hospital in New York City, Children's Hospital at Vanderbilt Medical Center in Nashville, Tennessee and many other medical facilities offer music therapy. The University of Michigan Medical Center is among a growing list of schools that offer programs to certify music practitioners. The American Music Therapy Association has specific curriculum requirements including courses in research analysis, physiology, acoustics, psychology and music and therapy. There are about 6000 certified music therapists in North America alone. Finally, there are hundreds of studies on music therapy in the medical literature. Granted, we have a long way to go before getting all the answers, or even close to that level. Nonetheless, trained athletes are generally very smart about their own bodies, and incorporating music therapy is worth trying. It potentially offers a high return on a small investment, and with virtually no risk. The results will speak for themselves, that is, if you listen carefully.