

How Music Makes Us Feel Better

Posted by [Maria Konnikova](#)



In 2012, a group of male patients underwent heart transplants at Teikyo University's Department of Surgery, in Tokyo, Japan. As they recovered, closely monitored by attending physicians, an alert onlooker may have noticed a subtle difference in each patient's recovery room: the ambient noise. Some rooms were silent. In others, Giuseppe Verdi's "La Traviata" played in the background. From yet other rooms emanated strains of the Berlin Philharmonic's interpretation of Mozart, or "The Best of Enya." A final set of rooms was filled with a steady sound frequency between a hundred and twenty thousand hertz.

For six days, researchers observed the patients to see how the different types of background sound would affect their recovery. Would music, they wondered, play a positive role in the healing process? And if so, did it matter what particular kind of music? Their conclusions would be limited: the patients were a group of laboratory mice. Still, the Tokyo researchers had high hopes; how the mice responded could be a step toward improving the recovery process from difficult medical procedures.

The idea that music can have therapeutic value is far from new: in ancient Egypt, chant therapies were seen as integral to the healing process, while in ancient Greece, both Aristotle and Plato embraced its beneficial properties, writing that it could help people become better human beings and overcome emotional difficulties during the process of catharsis. The first major movement in modern psychology, psychoanalysis, held that music could offer an effective means of sublimation—expressing inappropriate desires in socially appropriate ways—and greater access to a patient's unconscious. [More recent](#) approaches have included playing music in hospital wards and waiting areas to help improve patients' mood and their physical well-being. And we listen to music constantly in everyday life: we flip on Pandora or Spotify to set the mood for drinks with friends, a romantic date, or a workout. Music can psych us up before an important meeting, or calm us down after a stressful conversation. It can even help us vent our anger or express our love, as anyone who has ever created a mix for a significant other—and then a break-up mix when things didn't quite work out—can tell you.

In [a review](#) of over eighty studies on the use of music in therapeutic settings, the pediatrician Kathi Kemper and the psychologist Suzanne Danhauer concluded that music had multiple direct physiological effects: steady rhythms helped regulate breathing and elicited increased activity in the lateral temporal lobe, an area of the brain that helps integrate sensory inputs. In particular, classical music helped improve heart-rate variability, a measure of stress and resilience, while relaxing music led to decreased levels of cortisol, a stress hormone, in a group of students who were engaged in stressful activities. Music had, as well, more indirect effects on both emotion and behavior, making people happier, more relaxed, less anxious, and less overwhelmed. As a result of both the physiology and the psychology, the authors concluded, music was an effective way of improving outcomes for patients who had undergone surgery, or, indeed, any medical procedure.

Since Kemper and Danhauer's initial review, conducted eight years ago, the data have grown even stronger. Music has [now been used](#) therapeutically for a number of diseases, including dementia, schizophrenia, Alzheimer's, Parkinson's, and cerebral ischemia. In a study of chronic pain sufferers, researchers at the Cleveland Clinic [found](#) that listening to music helped patients experience less physical pain, as well as lower rates of depression; in a study of older people with dementia, scientists from the National Taipei College of Nursing [found that](#) playing background music during lunch significantly lowered both verbal and physical aggression. [In 2006](#), researchers discovered that even something as complex as open-heart surgery could be improved with a musical intervention: patients who listened to music during and after heart surgery not only felt

less anxious but required, on average, two hundred fewer minutes of intubation than those who had undergone standard procedure.

At Teikyo University, Masanori Niimi and his colleagues began to notice differences between the groups as the mice recovered: the mice placed in the silent or the single-frequency rooms suffered from acute graft rejection, as their immune systems rejected the foreign cells from the transplants. Those who had been listening to either Verdi or Mozart showed significantly improved survival outcomes, living an average of twenty days longer. The Enya listeners were not as fortunate: they did little better than the mice who had listened to nothing at all, living just four days longer, on average, than the mice exposed to noise or silence. The authors speculated that what might have been at play are the particular harmonies and musical features of a piece of music.

The human auditory cortex—the part of our brain devoted to hearing and listening—can differentiate between extremely specific frequencies of sound. In fact, single neurons [can adjust](#) to barely noticeable frequency shifts at a level that exceeds almost all other mammals (bats are the exception). Music with a four-four tempo, which corresponds closely to a normal heart rate, [can help](#) regulate heart rate, circulation, and breathing. Lyrical melodies and rhythms of about sixty to eighty beats a minute, which is common to much classical music and bird song, [can stimulate](#) relaxation and alpha brain waves, a type of pattern associated with wakeful relaxation. Yet music that departs from either of those tempos confers none of the benefits.

On September 12th, the Teikyo University team received public recognition for their efforts: the [IgNobel Prize](#) in Medicine, awarded annually for research that “makes people laugh and then think.” The implications of their findings may well contribute to more successful organ-transplant surgeries in humans in the future, at little additional medical cost beyond a simple music file. And they may prompt more careful consideration of the exact type of music that’s being played; Enya unfortunately has been a frequent therapeutic choice of prior researchers.

This all comes, of course, with a major disclaimer: what works in mice may not work in humans. In mental health, obesity, and some subsets of [oncology](#), the mouse-to-human translation is [fraught](#) with uncertainty. Decades of work on inflammatory diseases, for instance, have led to the [sad conclusion](#) that mouse models are severely limited, if not counterproductive, when it comes to humans. As Clif Barry, the chief of the Tuberculosis Research Section at the National Institute of Allergy and Infectious Disease, once told [Slate](#), “The truth is that for some questions, mice give you a very nice and easy model system for understanding what’s happening in humans, but mice are mice, and people are people. If we look to the mouse to model every aspect of the disease for man, and to model cures, we’re just wasting our time.”

In fact, most research on the therapeutic benefits of music in humans has been conducted on either older patients or infants—individuals who are more likely to prefer opera or classical music based on personal taste, on the one end, and, on the other, who’ve yet to develop any personal preferences at all. Babies are, in that latter sense, a bit more like mice, responding to the basic characteristics of the music rather than the music itself. For the generations in the middle, though, for whom opera may be somewhat foreign or a sign of generational rebellion, self-selected alternatives may be the better option. In a [recent review](#) of the data on music use in modern medicine, the biologist Guenther Bernatzky and his colleagues concluded that, as long as the music follows certain basic parameters, patient self-selection offers the best results in surgical outcomes. If patients don’t find the music inherently enjoyable the positive benefits to their recovery may not be nearly as great. Even the famous (or [infamous](#), as the case may be) Mozart effect [went away](#) with a group of over eight thousand British ten- and eleven-year-olds in the face of musical competition: instead of performing better after they’d heard Mozart, the children showed improvement after listening to music that they enjoyed more, recordings from the then popular band Blur. The researchers called it the Blur Effect. (On the other hand, grunge has been shown to negatively affect mood even if people say they like it.)

The Teikyo University mice may well have been responding to the different musical options on a purely physiological level, unlike humans, for whom psychology and preferences matter. But an alternative explanation for the Teikyo results, perhaps, is that no one, not even mice, would ever willingly choose to listen to Enya.

[Maria Konnikova](#) is the author of the New York Times best-seller “[Mastermind: How to Think Like Sherlock Holmes](#).” She has a Ph.D. in psychology from Columbia University.

Photograph: Elleringmann/Laif/Redux.