

# Music and the mind

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When I was chancellor of the University of North Carolina at Chapel Hill, I tried never to miss the annual concert of the Triangle Youth Symphony. When people asked me why I was such a regular, I complimented the music but also suggested that there were potential future college science majors on the stage. The strong correlation between scientific and musical ability is an association familiar to many scientists, but in recent years, the connections between music and the mind have begun receiving broader attention, partly because of an [unexpected partnership](#) between the former long-time director of the US National Institutes of Health Francis Collins, and soprano opera superstar Renée Fleming. I caught up with Collins and Fleming for an extended [chat](#) about their shared curiosity regarding the science of music and health.

Collins's interest in the relationship between science and music is perhaps not surprising. His longtime passion for music has been most evident through his performances with a band that includes other scientist-musicians. Fleming became interested in the links between science and music because, despite her extraordinary talent, she sometimes suffers from stage fright that is occasionally accompanied by chronic pain. When she turned to cognitive behavioral therapy to treat the fright and pain, the success of this approach ignited a curiosity about the science-music connection. She has edited a new book, [Music and Mind: Harnessing the Arts for Health and Wellness](#) (with a foreword by Collins), a collection of essays about the neuroscience of musicality and the ability of music to improve the human condition.

The essays cover the basic science of musical ability and how the brain processes music, but also touch upon whether musical ability was selected for by evolution or whether it hitched a ride on other selected traits. The book leans toward the side of selection for this quality, and Collins and Fleming told me they agree with this view. They also both believe that some musical aptitude is genetic and that although hard work is important, you can't practice your way to becoming a brilliant musician or singer.

I asked Collins and Fleming to tell me what each has learned so far about music and the mind that has been most surprising. Collins cited a study in which patients with chronic pain were engaged in either group or individual singing. Those who sang solo experienced some pain relief, whereas “the group singers were dramatically benefited by every measure of chronic pain,” said Collins. This observation was connected to oxytocin, a hormone that promotes positive emotions. “Many of them were elderly people whose chronic pain had gone down. Their oxytocin levels went up. Their measure of generosity was particularly affected in a positive direction by having had this experience. That was a well-designed study with a pretty clear end point.”

Fleming was most struck by a [study](#) conducted by cardiologist Jacquelyn Kulinski showing that singing improved vascular function. Fleming pondered whether singing boosts physical activity, possibly through a neural circuit that innervates muscles of the larynx (voice box). “When you think about it,” she said, “so many people with chronic conditions are sedentary either from the condition or in general. So, singing has an athleticism to it. You’re holding your breath. You’re producing sound. You’re also stimulating the vagus nerve. So, that was really a surprise to me.”

When I asked what they’d like to see scientists focus on more, Collins indicated the neuroscience of music therapy. “One wants to understand the mechanisms better to make music therapy even more effective than it is,” he said. “I think the way to achieve that might well be to get these disciplines to really learn to talk to each other, appreciate each other, learn from each other, develop a whole new discipline of how you can take the therapeutic benefits to the next level as we begin to unpack how the brain works.” For Fleming, it is how brain function is related to the human need for, and experience of, music. Here, Collins was more clinical, wanting to know the precise details of how music interacts with pain; such insight could lead to treatments without drugs.

Certainly, there are many challenges for this young field of study if the arts are to become part of standard health care. Leaders like Collins and Fleming will no doubt inspire further investigations into the fascinating intersection between science and the arts.

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