



## Choir singers' hearts beat as one

Singing together can be an emotional experience. As churchgoers, choir singers or sports fans raise their voices as one, they feel connected.

Turns out, that connection may have a physiological foundation. A small study suggests people who sing together have synchronized heartbeats.

Singers often inhale and exhale at similar times. When your heartbeat is connected to your breathing pattern, it's called respiratory sinus arrhythmia, or RSA. RSA can have a soothing effect on the cardiovascular system. For instance, past studies have shown guided breathing – like what's done in yoga – can be beneficial for high blood pressure problems.

“If this is correct, singing would probably have the same effect,” said Bjorn Vickhoff, a professional singer/songwriter-turned-neuroscientist at the University of Gothenburg in Sweden.

Vickhoff is fascinated by music's effect on the human body. He hopes to eventually find new ways music can be used in medicine, rehabilitation and preventative care. His latest study, published this week [in the journal \*Frontiers in Psychology\*](#), focuses on how song structure can affect a singer's heart rate.

## **The study**

Vickhoff and his colleagues gathered 15 healthy 18-year-olds at a high school in Gothenburg. They had the group perform three different choral exercises while recording the heart rates of each person.

The first exercise was monotone humming, where the participants were told to breathe as needed. For the second exercise, the teens sang a popular Swedish hymn and took breaths whenever. The third exercise was a slow mantra; participants were instructed to breathe only between the long phrases.

These three exercises allowed the researchers to see how coordinated (the mantra) and uncoordinated (humming) song phrasing affected the participants' heart rhythms while they were singing.

## **The results**

The researchers found that each singer's heartbeat was linked to the song's melody – i.e. the speed and structure of the music. They also found that when the choir sang together, their heart rates tended to increase and decrease at similar times.

“As soon as the singing begins, (the hearts) start following each other,” Vickhoff told CNN in an e-mail.

Humming and performing the mantra as a group resulted in more synchronized heart rate variability, or HRV, than singing the hymn.

“The impression is that the heart cannot completely follow the respiration (guided breathing) when it has a more complex, hierarchical structure,” the study authors wrote.

## **The caveats**

Four of the heart rate monitors malfunctioned, so only 11 sets of data were collected and analyzed. That's a very small study sample to make any steadfast conclusions. The study will have to be duplicated with more participants.

The researchers did not look at whether the increased HRV had a positive effect on the study participants. And any effect would be temporary, Vickhoff said.

“We do have the ambition to map the body responses to music and make medical applications,” he said. “But we (need to) test this as rigorously as new drugs are tested.”

## **A ‘thrilling’ theory**

Vickhoff likes to go beyond what his study analyzed to talk about the possible implications for this kind of music-body connection. In the journal article, he discusses the evolutionary question of why music is a universal phenomenon.

“David Huron, the cognitive musicologist, has suggested that music promotes bonding, and thus strengthens groups, which would have a survival value,” he said.

“Ultimately the knowledge that singing coordinates hearts is mind-blowing. If we, for instance, starting singing a slow hymn together in church, we now know that the hearts in the hall are coordinated. And the thrilling question is: How does this affect us?”

The study authors note that breathing together, whether it’s through meditating, praying or singing, is done in most religions.

“Joint action leads to joint perspectives,” they write. “In other words, singers may change their egocentric perspective of the world to a we-perspective, which causes them to perceive the world from the same point of view.”