

Laryngeal muscles found to be underdeveloped compared to articulatory muscles, explaining poor human singing

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A trio of researchers, one with Bloorview Research Institute in Canada, the other two with the University of Maastricht in The Netherlands, has

found that human laryngeal muscles are less well developed than articulatory muscles. In their paper published in *Royal Society Open Science*, Michel Belyk, Joseph Johnson and Sonja Kotz suggest that differences in the two muscle groups explains why people are better at whistling than singing.

Humans, it has been noted, are not naturally good singers, though some are noticeably better than others. But humans are pretty good at whistling, the researchers with this effort found, at least when compared with singing ability. This, they suggest, is because the muscles that control the mouth are more developed than those that control the larynx, in an evolutionary context.

The researcher wondered why highly trained singers, such as opera stars, are unable to match the precision of even the most basic of [musical instruments](#). To find out, they recruited 34 volunteers, some of whom self-reported as able to sing, and some who thought otherwise. Each was asked to sing melodies created by a computer and also to sing a scale of notes that went from the lowest they could utter to the highest. Each was then asked to repeat the experiment, but instead of singing, were asked to whistle the notes. A computer was used to analyze all of the notes to judge how precise the volunteers were.

The researchers report that all of the volunteers were better at staying on key while whistling than when they were singing, though they also noted that those better at singing in key were also better at whistling in key than those who were poor singers. The researchers also found that the volunteers more often went flat when singing and sharp when whistling.

The researchers suggest their results indicate that the muscles that control the larynx are less developed than those that control the lips and jaws, which strongly impacts precision. This, they further suggest, is due to the more recent evolutionary development of the [larynx](#) muscles. Our

ancient ancestors, they note, were likely whistlers, like modern apes.

More information: Michel Belyk et al. Poor neuro-motor tuning of the human larynx: a comparison of sung and whistled pitch imitation, *Royal Society Open Science* (2018). [DOI: 10.1098/rsos.171544](https://doi.org/10.1098/rsos.171544)

Abstract

Vocal imitation is a hallmark of human communication that underlies the capacity to learn to speak and sing. Even so, poor vocal imitation abilities are surprisingly common in the general population and even expert vocalists cannot match the precision of a musical instrument. Although humans have evolved a greater degree of control over the laryngeal muscles that govern voice production, this ability may be underdeveloped compared with control over the articulatory muscles, such as the tongue and lips, volitional control of which emerged earlier in primate evolution. Human participants imitated simple melodies by either singing (i.e. producing pitch with the larynx) or whistling (i.e. producing pitch with the lips and tongue). Sung notes were systematically biased towards each individual's habitual pitch, which we hypothesize may act to conserve muscular effort. Furthermore, while participants who sung more precisely also whistled more precisely, sung imitations were less precise than whistled imitations. The laryngeal muscles that control voice production are under less precise control than the oral muscles that are involved in whistling. This imprecision may be due to the relatively recent evolution of volitional laryngeal-motor control in humans, which may be tuned just well enough for the coarse modulation of vocal-pitch in speech.

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