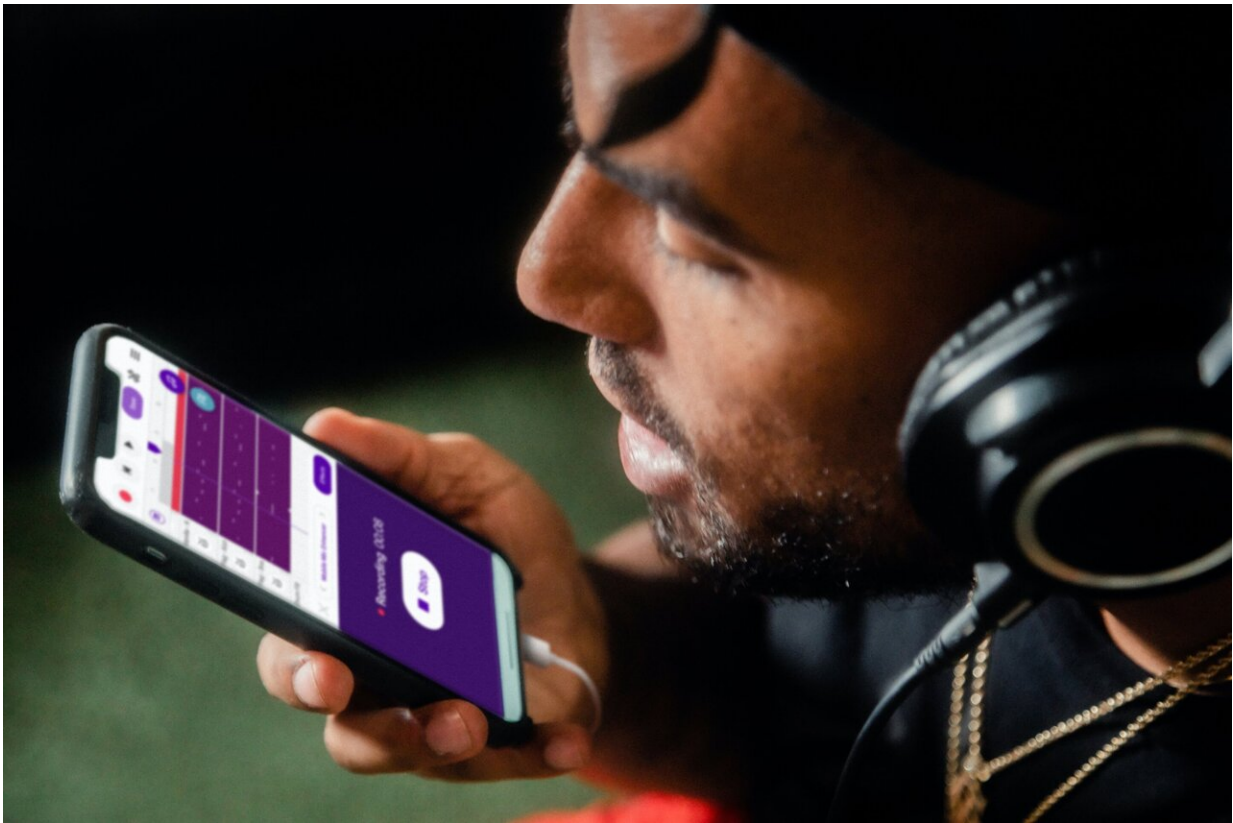# Evolution led to similarities in the melodies of animal vocalizations and human languages

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Credit: Unsplash/CC0 Public Domain

When listening closely, the melodies of human languages and animal vocalizations are very similar. However, it is not yet fully resolved if similar patterns in languages and animal vocalizations also have similar

meanings. Researchers of the University of Vienna present a new method to decode the meaning of animal vocalizations: the comparison of their melodies with human languages. The proposal was published in the journal Philosophical Transaction of the Royal Society B.

Dog barking, birdsong and human languages sound very different at first hearing. However, when analyzing these vocalizations more closely, one can find many similarities: for example, almost all human languages and animal vocalizations are structured by pauses and variations in their syllable length and pitch. Only the precise specifications of these characteristics differ between different human languages and animal vocalizations. In a review article, Theresa Matzinger and Tecumseh Fitch from the departments of English and Cognitive Biology took a closer look at the melodies of different languages and the vocalizations of non-human tetrapod species.

Similarities in the melodies of languages and animal vocalizations are conditioned by evolution

The similarities between melodies of different languages and animal vocalizations can be explained by their parallel evolution. Because of their shared evolutionary pathways over long timespans, humans and other tetrapods have similar vocal tracts and brain structures responsible for vocal production. Differences in the melodies of their vocalizations result from individual adaptations of different groups to the conditions in their respective environment. These individual adaptations are flexible: for example, at the beginning of the COVID-19 pandemic, birds sang with a lower pitch and amplitude to react to the reduced traffic noise.

Investigations of how animals perceive language-universal melodic structures are promising

"It has been widely investigated how animals produce sounds and how their vocalizations are structured. However, there is hardly any data on how animals perceive and interpret the melodies in their vocalizations", explains Matzinger, who currently works as a guest researcher at the University of Toruń (Poland). But how should researchers start to investigate the meaning of melodic patterns in animal vocalizations? "Promising candidates for the investigation of animals' interpretation of melodic patterns are those melodic patterns that occur and are interpreted similarly across all human languages", says Matzinger.

For example, syllables that are articulated longer than others are interpreted as boundaries between sentences or phases independently of the speakers' native language. This similar function of lengthened syllables across languages makes it likely that very basic physiological and cognitive processes are responsible not only for the production but also for the perception of melodic patterns. It is highly probable that because of the parallel evolution between humans and other tetrapods, other tetrapods also interpret lengthened sounds as phrase boundaries. A next important step in decoding the meaning of melodies in animal vocalizations would therefore be to experimentally test the perception and interpretation of lengthened sounds in animals.

The research was published in *Philosophical Transactions of the Royal Society B: Biological Sciences*.

Provided by University of Vienna