

Pronunciation of 's' sounds impacts perception of gender, researcher finds

January 4 2013

(Medical Xpress)—A person's style of speech—not just the pitch of his or her voice—may help determine whether the listener perceives the speaker to be male or female, according to a University of Colorado Boulder researcher who studied transgender people transitioning from female to male.

The way people pronounce their "s" sounds and the amount of [resonance](#) they use when speaking contributes to the perception of gender, according to Lal Zimman, whose findings are based on research he completed while earning his [doctoral degree](#) from CU-Boulder's linguistics department.

Zimman, who graduated in August, is presenting his research Jan. 5 at the annual meeting of the Linguistic Society of America in Boston.

"In the past, [gender differences](#) in the [voice](#) have been understood, primarily, as a biological difference," Zimman said. "I really wanted to look at the potential for other factors, other than how [testosterone](#) lowers the voice, to affect how a person's voice is perceived."

As part of the process of transitioning from female to male, participants in Zimman's study were treated with the [hormone testosterone](#), which causes a number of physical changes including the lowering of a person's voice. Zimman was interested in whether the style of a person's speech had any impact on how low a voice needed to drop before it was perceived as male.

What he found was that a voice could have a higher pitch and still be perceived as male if the speaker pronounced "s" sounds in a lower frequency, which is achieved by moving the tongue farther away from the teeth.

"A high-frequency 's' has long been stereotypically associated with women's speech, as well as [gay men](#)'s speech, yet there is no biological correlate to this association," said CU-Boulder linguistics and anthropology Associate Professor Kira Hall, who served as Zimman's doctoral adviser. "The project illustrates the socio-[biological complexity](#) of pitch: the designation of a voice as more masculine or more feminine is importantly influenced by other ideologically charged speech traits that are socially, not biologically, driven."

Vocal resonance also affected the perception of gender in Zimman's study. A deeper resonance—which can be thought of as a voice that seems to be emanating from the chest instead of from the head—is the result of both biology and practice. Resonance is lower for people whose larynx is deeper in their throats, but people learn to manipulate the position of their larynx when they're young, with male children pulling their larynxes down a little bit and female children pushing them up, Zimman said.

For his study, Zimman recorded the voices of 15 transgender men, all of whom live in the San Francisco Bay area. To determine the frequency of the "s" sounds each participant made, Zimman used software developed by fellow linguists. Then, to see how the "s" sounds affected perception, Zimman digitally manipulated the recording of each participant's voice, sliding the pitch from higher to lower, and asked a group of 10 listeners to identify the gender of the speaker. Using the recordings, Zimman was able to pinpoint how low each individual's voice had to drop before the majority of the group perceived the speaker to be male.

Provided by University of Colorado at Boulder

Citation: Pronunciation of 's' sounds impacts perception of gender, researcher finds (2013, January 4) retrieved 23 April 2024 from <https://medicalxpress.com/news/2013-01-pronunciation-impacts-perception-gender.html>

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