

AN INVESTIGATION OF THE ACOUSTIC VOWEL SPACE OF SINGING

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ABSTRACT

Speaking and singing use the same vocal apparatus, but to very different effect. While the articulatory and acoustic properties on speech require the speaker to balance perceptibility and articulatory effort concerns, these pressures are moderated in singing by additional concerns for consistent resonance, expression, and style. This study aims to determine whether acoustic changes caused by singing which affect vowels have a systematic effect upon the acoustic vowel space which could have consequences for the linguistic content of sung lyrics.

One major difference between speech and singing is larynx height, which tends to be lower during singing. Larynx height varies during speech, and is associated with vowel identity. The effect of larynx lowering causes the first and second formant frequencies of most vowels to be lowered, generating predictions for changes in vowel space between the two registers.

In order to compare the vowel spaces used during singing and speech, singers were recorded singing and speaking the lyrics of a song, and the formant frequencies of each vowel were analyzed. Analysis of spoken and sung vowel spaces indicates that the vowel space undergoes systematic changes during singing. Some of these changes are consistent with larynx lowering, but other articulation changes occur, and articulation strategies may be employed differently by male and female singers.