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Acoustic characteristics of voice in music and straight theatre: Conceptions and questions

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In comparison to non-trained voices, stage voices generally feature greater efficiency, projection and dynamic range. In singing, this is closely connected with style-specific strategies to balance vowel timbre and adjust articulation on higher fundamental frequencies in order to obtain a homogenous voice timbre and maintain the efficiency of vocal performance.

These training and style-specific properties are commonly related to (1) adjustment of vocal tract resonances to frequencies of partials, in particular for mid and high-range fundamental frequencies ("resonance/formant tuning"), (2) increased intensity of mid and high-range frequencies, (3) a distinct peak of a relative energy maximum at 2.5 to 3kHz for singing ("singer's formant") and approximately 3.5 kHz for stage acting ("actor's formant") and (4) a style-specific vibrato in „classical" singing („legit").

Taking into consideration the latest techniques of digitization and real-time spectral visualization and their possible application for vocal training, we are faced with the question of the reliability of style-specific, acoustic evidence as given in the literature. A current research project at the Institute for the Performing Arts and Film (Zurich University of the Arts) and the Phonetics Laboratory (University of Zurich) tackles this question. At the core of the project lie recordings with systematically varying production parameters typically found for stage voices: (1) fundamental frequency, (2) loudness/vocal effort and (3) vocal style. The aim of the project is to establish a systematic basis for the analysis of acoustic characteristics of trained stage voices and the differences between trained and untrained voices.

The present contribution gives an overview of current approaches to acoustic characteristics of stage voices with varying fundamental frequency, varying loudness/vocal effort and varying vocal style, and outlines and illustrates the questions that form the basis of the above-mentioned project.

The corresponding methodological issues are presented in a separate, parallel submission (see "Acoustic analysis of vowel sounds including extensive variation of fundamental frequency").