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**Acoustical analysis of timbral modulations on the flute as
controlled by phonetic gestures**

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The purpose of this project is to study the control of timbre on the flute by varying articulatory parameters (i.e. embouchure) which correspond to distinct phonetic gestures. The main goal is to compare the production of a specific timbral modulation on the flute and its vocal reproduction (diphthong) by means of acoustical analyses of these sounds. The recordings of timbral modulations performed on the flute (e.g. by increasing the mouth opening) and reproduced vocally as diphthongs (e.g. [u] -> [a] transition) have been analyzed acoustically for intensity as well as for the first two formant trajectories. The results of the formant analyses as presented in an F1-F2 plane reveal the cardinal vowel triangle and confirm a correlation between the flute timbre modulations and the vocal diphthongs corresponding to the underlying phonetic gestures. In addition, a listening test has shown that flutists are able to perceive and recognize these timbral modulations from the sound alone.