Temporal coordination of articulatory and respiratory events prior to speech initiation

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Pauses are acoustically silent intervals where speakers plan subsequent utterances on different levels (Krivokapic 2014). Planning on the phonetic level involves the articulatory movements towards the first segments. That means, some preparatory vocal tract activities, such as various tongue postures and lips position occur during speech preparation and they seem to be temporally organized with each other (Gick et al. 2004; Ramanarayanan et al. 2009, 2013; Rasskazova et al. 2018). Respiration has not been considered in this process so far, although it cannot be separated from articulation and so involved in the speech planning process. Although respiration is slower than oral articulation, both should be well timed with each other, particularly at the onset of speech.

The aim of present study is to investigate the coordination of respiratory, acoustic and articulation events prior to the utterance begin. Furthermore, we explore if there is a coordination between exhalation onset and a specific phase of the articulatory gesture of an upcoming segment. For this purpose, 12 native speakers of German have been recorded with Electromagnetic Articulography and Inductance Plethysmography reading sentences that were controlled for length, stress of the first word and the initial segment.

The results for six speakers so far indicate that the initiation of the first post-pausal segments starts during the final phase of the inhalation. The onset of expiration seems to be tightly coupled with the acoustic and the articulatory onset, particularly with nucleus onset phase of the alveolar articulator of the initial segment. The manner of articulation of the initial segment seems to affect the temporal organization of preparatory events. These results can be interpreted as evidence for a close coupling between respiration and oral action for gestural organization.

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