Specification in context – incorporation of an aritculatory factor into the Context Sequence Model.

Polish sonorants demonstrate remarkable differences in the voicing behavior in obstruent-sonorant clusters. Their phonological unlicensing for [voice] in the word-final position when preceded by a voiceless obstruent excludes them from a syllable, which causes their devoicing (Gussmann, 1992). Similarly, their syllable coupling patterning in the same phonetic surrounding provides articulatory explanation for the lack of voicing (Bruni, 2011). This study presents the integration of an articulatory factor into the Context Sequence Model (CSM) (Wade et al., 2010) of speech production using Polish sonorant data measured with the Electromagnetic Articulograph Technology (EMA) (Mücke et al., 2010). Based on exemplar-theoretic assumptions (Pierrehumbert 2001), the CSM models the speech production-perception loop operating on a flat, detail-rich memory of previously processed speech utterance exemplars. Selection of an item for production is based on context matching, comparing the context of the currently produced utterance with the contexts of stored candidate items in memory. As demonstrated by Wade et al. (2010), the underlying exemplar weighing for speech production is based on about 0.5 s of preceding acoustic context and following linguistic match of the exemplars. Reconsidering the basic assumptions of the CSM—the perception-production feedback loop and the detailed episodic memory—we extended the work by incorporating articulatory information in parallel to the acoustic representation of the speech exemplars used by the model. Thus, our study demonstrates that also memorized raw articulatory information—movement habits of the speaker—can be available during speech production within the Context Sequence Model. Successful incorporation of this factor into a context-sensitive model shows that not only acoustic but also articulatory information can be made directly available during speech production.

Word count: 282

References

Bruni, J.: Sonorant voicing specification in phonetic, phonological and articulatory context. Doctoral Dissertation. Universität Stuttgart, 2011.

Gussmann, E.: Resyllabification and Delinking: The Case of Polish Voicing. Linguistic Inquiry, Vol. 23, 1992, p. 29-56.

Mücke, D., Sieczkowska, J., Niemann, H., Grice, M., Dogil, G.: Sonority profiles, gestural coordination and phonolgical licensing: obstruent-sonorant clusters in Polish. Poster Presentation during LabPhon Conference 2010, Albuquerque, New Mexico.

Pierrehumbert, J.: Exemplar dynamics: Word frequency, lenition, and contrast. In: J. Bybee & P. Hopper (Eds.), Frequency and the emergence of linguistic structure, 2001. pp. 137–157. Amsterdam: Benjamins.

Wade, Travis; Dogil, Grzegorz; Schütze, Hinrich; Walsh, Michael and Möbius, Bernd: “Syllable frequency effects in a context-sensitive segment production model”. Journal of Phonetics, 38:227-239, 2010.