

Articulatory retiming: investigations from cross-modal linguistic evidence

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The study of phonological assimilation processes has long been a window into the organization and coordination of articulatory units of spoken language. Within the framework of Articulatory Phonology, assimilation is motivated by the retiming of articulations such that there is gestural overlap in the production of sequences of phonological segments (Browman & Goldstein, 1992). Quantitative evidence from cross-linguistic comparison shows common strong tendencies toward anticipatory retiming in consonant-to-vowel assimilation, in which the gestures associated with a following vowel are anticipated and retimed to start during the articulation of a consonant (Bybee & Easterday under review). Despite these robust findings, linguists have yet to compare these tendencies across modalities. Though some scholars have applied the Articulatory Phonology framework to the analysis of signed languages (Wilcox, 1988; Keane, 2013), to our knowledge, no research currently exists on gestural retiming in signed languages.

In the present study, we compare retiming tendencies in signed and spoken modalities. Our data on assimilation in spoken languages comes from Allophon, a database of 820 allophonic processes extracted from a sample of 82 languages selected to maximize genetic and geographic diversity (Bybee & Easterday under review). For each allophonic process, the articulatory gestures associated with the input segment, the output segment, and the conditioning environments were coded, and all retimings analyzed. Our analysis shows that gestural retiming was involved in 371 of the 820 processes; that is, the output segment was produced as an effect of the overlap of an articulatory gesture associated with the conditioning environment. Of these processes, 253 (68%) involve anticipatory retiming, while 118 (32%) involve carry-over retiming. A typical example of anticipatory retiming is represented by the following process in Margi (Chadic, Nigeria): Consonants become palatalized preceding a high front vowel (Hoffman 1963: 40). Here during articulation of the consonant, the tongue body moves into the high front position associated with the following high front vowel.

Our data on retiming processes in signed languages comes from phonological analyses of what have been traditionally called compounds. Signed compounds are formed when two signs become fused phonologically. In addition to rampant reduction at these sign boundaries, there is often evidence of articulatory retiming among segments of the two signs as they merge. A pilot study of signs from American Sign Language (ASL) analyzed 50 compounds to determine whether signed languages follow a similar preference for anticipatory retiming. Examples of such compounds include BELIEVE, which is a compound of the signs THINK and MARRY in

which the orientation of the 1-handshape in THINK assimilates to match the orientation of the handshape in MARRY (fig. 1).

Of 50 tokens, we observed 25 examples of assimilation. Of these 25 instances of assimilation, 19 (76%) were found to be anticipatory while only four (16%) were instances of carry-over retiming. Additionally, two tokens within our set showed evidence of both anticipatory and carry-over retiming, each in different features of the sign. These preliminary analyses suggest that signed languages, like spoken languages, have a preference for anticipatory retiming.

Here we suggest that like spoken language, retiming in signed languages is governed by domain-general modality non-specific processes related to motor routines. Neuromotor research suggests that even non-human primates plan subsequent motor routines during their current motor program (Miyashita et al. 1996; Rand et al. 1998; Rhodes et al. 2004.) Furthermore, as Bybee (2015) states, “producing a word or a phrase containing a sequence of articulatory gestures can be seen as analogous to other repeated behaviors, such as starting your car or tying your shoes, (p. 47).” Thus assimilation arises from the repetition and entrenchment of frequent and practiced neuromotor activity. Findings from spoken and now signed languages support the view that anticipatory retiming is an important domain-general cognitive tendency in organisms occurring within repeated motor routines that are processed as chunks.

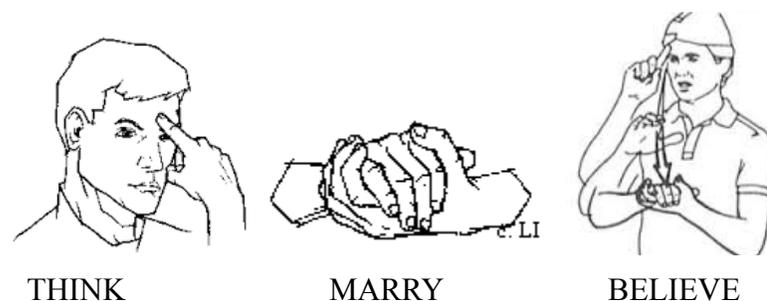


Fig.1) ASL signs THINK and MARRY versus the ASL compound BELIEVE

Citations

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