Co-articulation of Complex Segments with High Front Vowels
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We investigate the interaction of complex segments involving a dorsal constriction with following underlying front vowels using Corrected High-speed Anchored Ultrasound with Software Alignment (CHAUSA) at 114 fps. We posit a single phonological constraint that prohibits the co-occurrence of [i] with coronal clicks and labial-velars in Khoesan and West African languages and the articulatory basis for different repair strategies adopted in the different languages.

In coronal clicks, both constrictions are lingual. Thus, fronting the dorsal constriction is not the preferred repair strategy because it results in the loss of a constriction and the airstream. We compare the palatal gestures in underlying /i/ vowels following all four clicks from the first trace of the vowel through the midpoint of the vowel, at intervals of 8 ms. Due to a phonotactic constraint that rules out the co-occurrence of [!] and [][] with following front vowels, /i/ is realized as [i] following the dental [?] and palatal [?] clicks, but as [?i] following the central alveolar [?] and lateral alveolar [?] clicks. The beginning of the /i/ gesture starts out with two constrictions in the dental, palatal and lateral click types, due to co-articulation. Slowly, the two constrictions merge into one, following different paths for the different clicks. In the dental click, a peak intermediate to the two click constrictions forms. In the palatal click, the back constriction dissolves completely, leaving a more fronted vocalic constriction that maintains the location of the anterior click constriction.

In the [?] and [?] clicks, both constrictions dissolve completely, and a separate intermediate palatal constriction forms for the [i]. In the alveolar click, there is tongue tip recoil, which leads to an extremely rapid dissolution of the anterior constriction compared with the other clicks. Results show that lingual articulations with two constrictions are still perceived as [i] as long as the tongue center maintains a high enough position as found with the vowels following [?] and [?]. The higher constriction peaks associated with a preceding click consonant that are maintained on either side of the palatal constriction associated with [i] do not change the perception of the vowel.

Labial-velars differ from coronal clicks in that they involve a labial gesture, as well as a lingual gesture. The labial-velars of Dagbani (Gur) and Nzema (Kwa) have been claimed to be realized as [t?p] preceding [i]. (Ladefoged 1964). We show using CHAUSA data, that in Dagbani, the back and root of the tongue retract towards the pharyngeal wall when /kp/ precedes [?]. In the [i] context, the entire lingual gesture moves forward. This repair strategy is possible because the change of the consonantal lingual gesture with the labial-velars allows the maintenance of the double constrictions and the airstream. Thus, while different strategies are adopted by the different languages, the constraint is satisfied by preserving the double constrictions and airstreams in both clicks and labial-velars.