COARTICULATION IN SOME SWEDISH STOP SYLLABLES

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This investigation was started because results from an earlier study of coarticulation needed to be tested and, hopefully, verified. From them, the following working hypothesis was formulated: Initial and final F_2-frequencies in symmetrical CVC-syllables with stops can be described in terms of an inherent feature (formant frequency) of the vowel segment.

Those earlier results indicate that the initial and final F_2-frequencies in dVd-syllables can be reasonably well predicted from the F_2-frequency in the vowel segment. The functions derived (hyperbola - like functions) are not easily understood, and articulatory correlates would be hard to find. If the initial and final F_2-frequencies are related to the vowel's F_1, the results are easier to grasp. F_1 plotted as a function of F_2 initially and finally turns out to be an area, similar in shape, but not in size, to the acoustic vowel space (F_1 as a function of F_2 for the vowels in the language).

A general observation in that dVd-study is that the F_2-frequencies have a very limited range of variation initially, whereas the final values are much more like the vowel's F_2. This fact is interpreted as an apical occlusion before the tongue body movement has been completed.

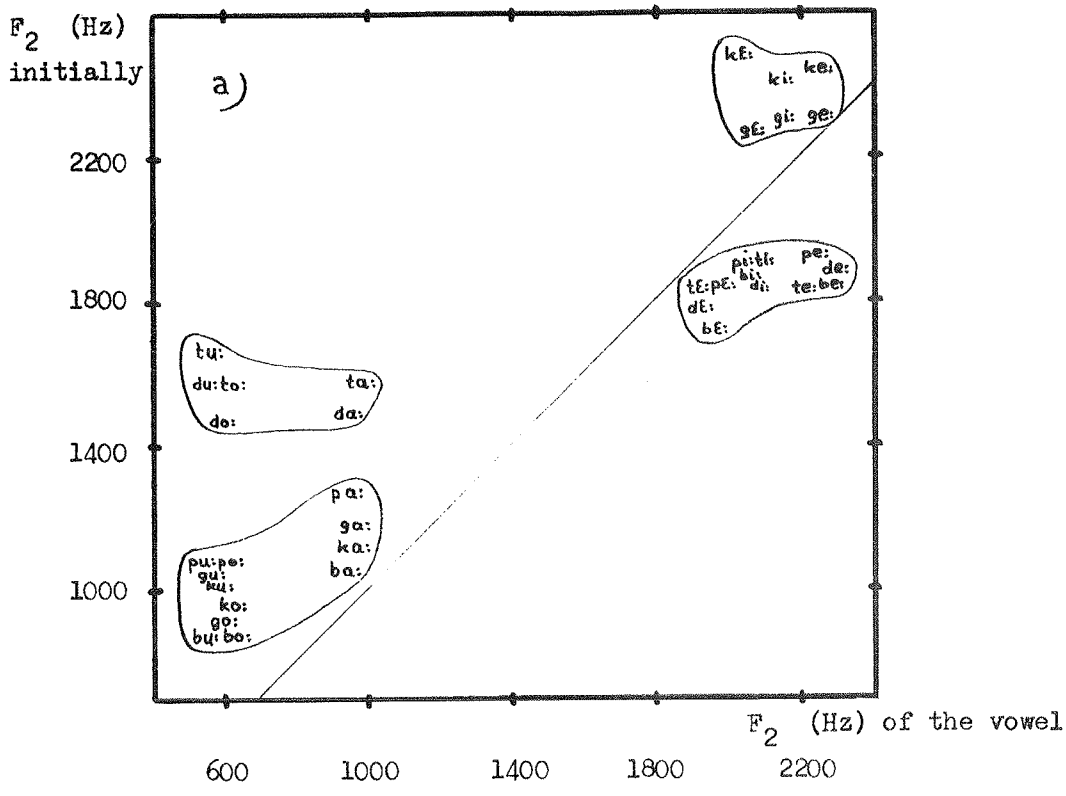
The present study includes all Swedish stops in symmetrical CVC-syllables with the vowels /i: e: ɛ: a: o: u:/. The previous results are borne out for /d/ and /t/, but new formulations are neeeded to capture all places of articulation.

Figure 1: Plotted against the vowel's F_2, both the initial and final F_2-values form the same groups (with the exception of finally dipthongized /i:/): Velars with front vowels, dentals and labials with front vowels, dentals with back vowels, and velars and labials with back vowels. Figure 2: Plotted against the vowel's F_1, exactly the same groups can be identified.

The investigator's interpretation is that there is a basic tongue position for the "typical" case of coarticulation (dentals/labials with front vowels and velars/labials with back vowels) and a fronted tongue position for velar stops with front vowels and for dental stops with back vowels. Thus labial articulation (with unaffected tongue body) becomes the "norm". A coarticulation space in the F_1-F_2-plane, similar in shape and constitution to the acoustic vowel space, can be specified for each place of articulation.

At the time of this symposium, results from F_3-measurements have not yet been evaluated.

Fig. 1 a and b: Initial and final (a and b) coarticulation categories in the F_2- plane. Initial = at the instant of release, final = at the instant of vowel offset.



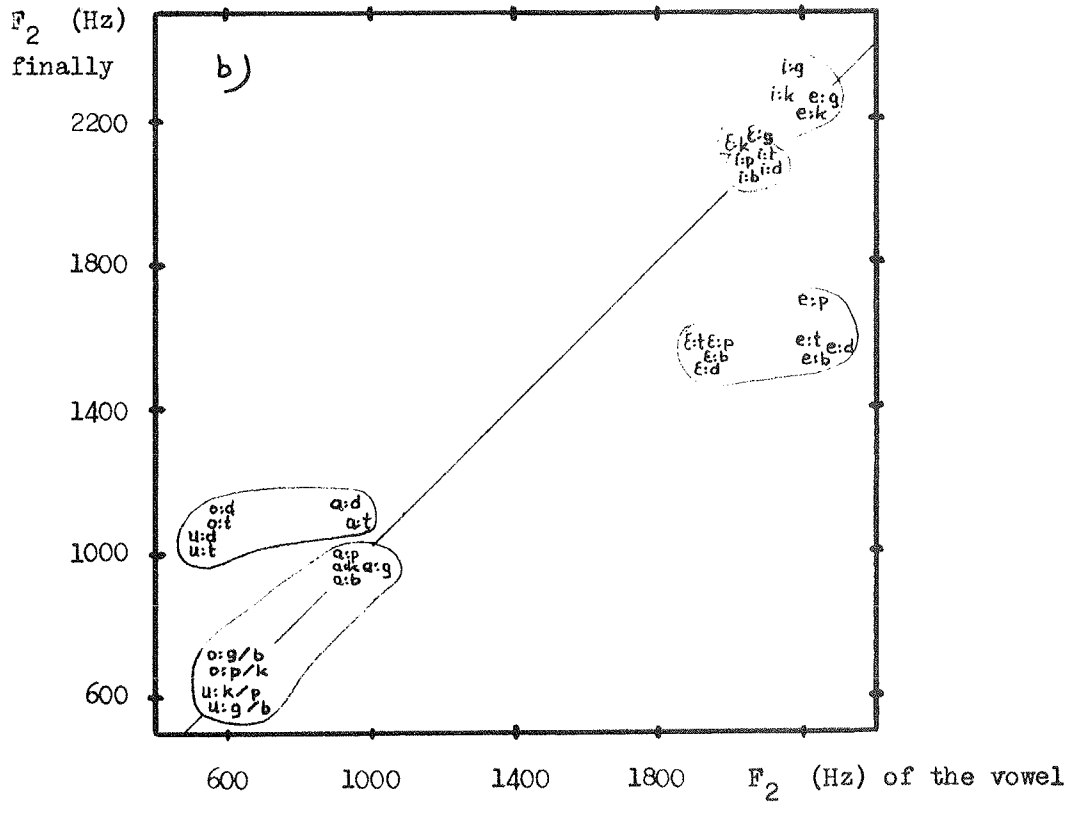


Fig. 2 a and b: Initial and final (a and b) coarticulation categories in the F_1- F_2- plane. Initial = at the instant of release, final = at the instant of vowel offset.