## IS A HIGH, LOW, BACK, NONBACK SOUND POSSIBLE?

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Chomsky and Halle (1968) propose the features high-nonhigh, low-nonlow, and back-nonback to characterize the position of the tongue body in relation to its neutral position, for consonants as well as for vowels, with the constraint that "the phonetic characterization of 'low' and 'high' rules out sounds that are $\begin{bmatrix} +\text{low} \\ +\text{high} \end{bmatrix}$ , for it is impossible to raise the body of the tongue above the neutral position and simultaneously lower it below that level" (p. 305).

This constraint has not been questioned, to our knowledge. However, the constraint appears to be based on a faulty definition of the feature [low], since '[+low]' consonants (glottals and pharyngeals) do not necessarily involve lowering of the tongue body, but merely a constriction in the lower part of the vocal tract, namely the glottis or the hypopharynx. The latter constriction is mainly implemented by a horizontal (backing) movement of the tongue root. As we shall presently see, Chomsky and Halle's misdefinition has certain undesirable consequences.

The tongue-body consonants are represented by Chomsky and Halle as in Table 1 (copied from op. cit., p. 305).

Table 1

|      | palatals | velars | uvulars | pharyngeals |
|------|----------|--------|---------|-------------|
| high | +        | +      | −       | −           |
| low  | −        | −      | −       | +           |
| back | −        | +      | +       | +           |

It is important to note that Chomsky and Halle are referring only to noncoronal nonanterior consonants here. For other consonants (which are anterior and/or coronal) the features 'high', 'low', and 'back' "may be used in a natural manner to characterize subsidiary ... articulations such as palatalization, velarization, and pharyngealization. ...We shall say that palatalized consonants are high and nonback; velarized consonants are high and back; the pharyngealized consonants... are low and back" (p. 305 f. ).

Arguing against "the former framework" of distinctive features (with diffuse, compact and grave generally corresponding to Chomsky and Halle's high, low, and back, respectively) they claim now to be able to "explain why these subsidiary articulations are not found with consonants that are formed with the body of the tongue, i.e., consonants that are noncoronal and non-anterior in the present framework" (p. 307). They further maintain that "palatalization, velarization, and pharyngealization are mutually exclusive" because "the co-occurrence of these articulations is a logical impossibility since a given sound cannot be back and nonback" (p. 307 f. ). It seems clear, however, that in theory a sound can be both [+high] and [+low], and [+back] and [−back], since one may raise the front part of the tongue while backing

the lower part.  And in fact such sounds do seem to exist.

Among others, Lomtatidze (1967, and personal communication 1975) reports that in the Northwest Caucasian languages Abaza and Abkhaz there is a <u>palatalized pharyngeal ejective</u> (there is also an <u>unpalatalized</u> and a labialized pharyngeal ejective; most consonants appear, in principle, with a palatalized and/or labialized variety, yielding a 3x3 matrix, maximally: voiced-voiceless-ejective x plain-palatalized-labialized). As a pharyngeal is phonologically represented as $\begin{bmatrix} +\text{low} \\ +\text{back} \end{bmatrix}$, and palatalization as $\begin{bmatrix} +\text{high} \\ -\text{back} \end{bmatrix}$, the Abaza and Abkhaz consonant in question will presumably be represented as $\begin{bmatrix} +\text{high} \\ +\text{low} \\ +\text{back} \\ -\text{back} \end{bmatrix}$.  The representational system obviously needs refinement to show which features 'go together' when multiple articulations are present; in this case, something like $\begin{bmatrix} +\text{low} \\ +\text{back} \\ \begin{bmatrix} +\text{high} \\ -\text{back} \end{bmatrix} \end{bmatrix}$ with the 'secondary articulation' in double brackets.

Chomsky and Halle also assume that clicks involve secondary articulations: "The chief examples of the role played by the release of secondary closures are provided by the clicks.  Clicks are formed with two or even three simultaneous closures.  In the terms of the framework developed here, clicks are noncontinuants with extreme velarization, i. e., $\begin{bmatrix} +\text{high} \\ +\text{back} \end{bmatrix}$.  They may or may not be glottalized" (p. 319).  (This passage implies, although they avoid saying so, that [+high] and [+low] are not incompatible.)

In our system, e. g. a dental click would be represented as $\begin{bmatrix} +\text{anterior} \\ +\text{coronal} \\ \begin{bmatrix} +\text{high} \\ +\text{back} \end{bmatrix} \end{bmatrix}$ (plus the release features).

We now have a system for showing the tongue articulating 'in two places at once, ' an ability unique to this speech organ and one which Chomsky and Halle explicitly  recognize in the 'horizontal' dimension only, not in the 'vertical. '  However, as we have seen, Abaza and Abkhaz do utilize this ability in the 'vertical' dimension.

In the same fashion, Chomsky and Halle's representation of labiovelars (p. 311) might be refined, e. g. $\begin{bmatrix} +\text{anterior} \\ -\text{coronal} \\ \begin{bmatrix} +\text{high} \\ +\text{back} \end{bmatrix} \end{bmatrix}$ , to make it look less strange.  This strangeness could be ignored by them because of the possibility of concatenating the two features [anterior] and [back], which do not have the apparent blatant semantic incompatibility of e. g. [+high] and [+low] or [+front] and [+back].

## Appendix

The sound of the palatalized pharyngeal ejective resembles that which may be involuntarily produced by one who is being tickled under his chin. Unfortunately we have no informant available to do experimental phonetic research on this language.

## References

Chomsky, N., and M. Halle (1968) The Sound Pattern of English. Harper & Row.

Lomtatidze, K. V. (1967) Abkhazskij jazyk, and Abazinskij jazyk, in Jazyki narodov SSSR, Vol. 4, "Iberijsko-kavkazskie jazyki," pp. 101-122 and 123-144, respectively. Nauka, Moscow.