PHARYNGEAL EXPANSION: ITS USE IN SRE VOWELS AND ITS PLACE IN PHONOLOGICAL THEORY

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1. The vowels of Sre present a feature which has interesting implications for phonological theory. The high front vowel /i/ is realized as [i, ɪ] while the mid-high front vowel /e/ is realized as [i, ɪ, e^]. The higher allophones of these two phonemes generally occur in open syllables and before liquids and nasals, while the more lax allophones generally occur before obstruent finals. Thus it is not only possible, but in fact often happens that, in a minimal pair where the phonemes /i/ and /e/ contrast, the allophones will be indistinguishable as far as tongue height alone is concerned, e.g., /ntì̀ng/ 'bone' and /ntè̀ng/ 'where', where the two vowels are both represented by a long, high, tense front syllabic. There is, however, another articulatory factor at work which serves to maintain the auditory distinctiveness of these vowels --namely, the relative advancement of the tongue root (and, often, a certain lowering of the larynx), resulting in an expanded pharyngeal cavity with concomitant deeper, more resonant, or 'spooky' quality; or, in case of retraction from neutral position, in a more tense, constricted type of sound. With /i/ there is always some degree, however slight, of tongue root advancement, while with /e/ there never is. The degree of tongue root advancement in Sre is exceedingly subtle--not nearly as pronounced as in some

her Mountain Mon Khmer languages of South Vietnam
or example, Jeh).

Although this expanded pharyngeal cavity is vital
keeping /i/ distinct from /e/ (in the environments
ted), it may also co-occur--though optionally and
thout phonemic consequences--with other vowels.
/, for example, may be pronounced with the tongue
ot in neutral position, much like English /u/, or it
y be given a slightly 'spooky' quality by advancing
e tongue root. The expanded pharyngeal cavity is
t necessary to keep /u/ separate from /o/, though,
nce the heights of their respective allophones do
t overlap, i.e., /u/ [u, ʊ], /o/ [o, oˆ]. However,
ere are three vowels which can never be uttered with
panded pharynx: /e, o, ɑ/. These vowels are tense
onsiderably more so than their nearest English
uivalents), involving both the muscles of the lower
w and some tension--and slight constriction--of the
aryngeal cavity as well: this tension of the pha-
ngeal cavity is not so pronounced, however, as to be
ntamount to out-and-out pharyngealization.

This set of vowels also functions similarly with
spect to length. /ɑ/ never occurs non-long, but is
ways long; /e/ and /o/ virtually always occur long:
at is, out of thousands of technically possible
nosyllables checked, non-long realizations of /e/
d /o/ only turned up a few times--nearly always in
oper names. It appears, then, that these three
wels are basically different from the rest in being
rkedly tense and in not permitting non-long reali-
tions.

What we seem to be dealing with here are two
tersecting vocalic systems, one set of tense vowels
, o, ɑ/ which can never (with the non-crucial

exceptions noted above) occur non-long and can never be accompanied by expanded pharynx; and one set of non-tense vowels which may be either long or short an which may be accompanied by a pharyngeal articulation varying from neutral to slightly expanded.

Actually, since tongue height performs most of the work in preserving phonemic space, the distinctio between these two intersecting vocalic systems might be thought of, for Sre, as redundantly phonemic--as a *kind of 'reserve' phonemic system which is called int* play (i.e., rendered phonemic) when vowel heights con verge too closely.

2. In her discussion of Cambodian pronunciation, Henderson (1952:151) talks of two 'registers', the characteristic of the first being a head voice quality, the characteristic of the second being a 'deep, rather breathy or "sepulchral" voice, pronounced with lowering of the larynx, and frequently accompanied by a certain dilation of the nostrils'. Second register vowels in Cambodian appear to correspond to Sre vowel pronounced with expanded pharynx, the same characteristic flaring of the nostrils being frequently observ able. The difference between Sre and Cambodian, with respect to this registral feature, is that while, for Cambodian, the first is the normal or unmarked register--pharyngeal expansion being marked--for Sre it is the other way around: the vowels that can be accompanied by pharyngeal expansion are the unmarked set, while the three tense vowels are marked.

The use of pharyngeal expansion in phonological systems is not limited to the Southeast Asian area but is apparently widely used also in West African languages. In his article on Akan vowel harmony, Stewart (1967) noted that Akan vowels fell into two

armonizing sets'. In trying to determine the
ticulatory basis for the harmony, some investi-
tors, he noted, had singled out relative tongue
ight, while others had ascribed it to the tense/lax
stinction. Stewart found both these theses unac-
ptable, relative tongue height because the tongue
ights were not constant, tenseness/laxness because
ile the so-called 'raised' vowels were all tense,
e 'unraised' vowels were not only not lax but, be-
use of pharyngeal tightness, had a degree of tense-
ss *which often gave Stewart the impression of being*
hoked or even strangled' (1967:196). The common
nominator which Stewart finds underlying all vowels
the so-called 'raised' set is tongue root advance-
nt, resulting in enlarged pharyngeal cavity.
reover, this expanded pharyngeal cavity gave all the
wels of this set a 'fuller, deeper' timbre. Stewart
ds by concluding that tongue root expansion is the
st important factor in distinguishing the sets of
wels in Akan.

Other phoneticians have noted and commented upon
aryngeal expansion as a dimension of articulatory
onetics. Abercrombie (1967:101) mentions it, citing
nderson (1952). And, in an article entitled *Tongue*
oot Position in Practical Phonetics, Pike (1967)
gues that the tongue root 'needs to be treated
riously as an articulator' in vowel systems 'rather
an being relegated to a minor role', and that (1967:
2) 'since the throat change can be made while any
e vowel position, in its normal blade contour, is
ld approximately constant, the range of variability
throat openness needs to be treated as a parameter
rtially (to some degree yet to be determined) *inde-*
ndent of the blade of the tongue'.

4. Despite its importance, both for articulatory phonetics and for the phonological systems of many languages, pharyngeal expansion is not recognized as an independent feature in either of two recent, ambitious attempts to fashion a universal framework for phonological analyses, namely *The Sound Pattern of English* (Chomsky and Halle 1968) and *Preliminaries to Linguistic Phonetics* (Ladefoged 1971). Chomsky and Halle (1968:315) tentatively propose a feature called *covered* and they assume that 'covered sounds are produced with a pharynx in which the walls are narrowed and tensed and the larynx raised; uncovered sounds are produced without a special narrowing and tensing of the pharynx'. They believe the feature to be restricted to vowels and to be found 'primarily in West African languages exhibiting vowel harmony'. It is interesting that although they cite Stewart (1967) as providing 'strong supporting evidence' for positing the *covered* feature, in reality, Stewart singled out pharyngeal *expansion* (tongue root advancement), not pharyngeal constriction (narrowing, tensing) as the crucial factor in Akan vowel harmony. So the system proposed by Chomsky and Halle leaves us without any way of representing, on the phonological level, contrasts involving pharyngeal expansion. Indeed, it is noteworthy that register is not dealt with at all in *Sound Pattern*; and Henderson's (1952) article on Cambodian pronunciation is not even listed in the bibliography.

In his recent attempt to develop a 'set of features which would be appropriate for phonological descriptions' Ladefoged (1971:4) also seems to have neglected pharyngeal expansion as an independent feature worthy of representation in a universal

nological framework. In discussing vowels features says (1971:45) ' ... we also need a feature of gue shape in order to be able to specify the difence between tense and lax vowels. To make it te clear that this feature is being defined by ference to the action of the tongue alone, it should termed *tongue tension*; but we will follow the usual ctice and simply call the feature *tension*'. He fines this feature (1971:75), technically, as 'the gree to which the root of the tongue is pulled ford so that the tongue is bunched up lengthways'. seems to be implying that tongue root advancement d therefore pharyngeal expansion) is a by-product the feature *tension*. In fact (1971:70), he disys cineradiographic tracings of certain Igbo vowels ch demonstrate that with vowels of identical height tense vowels are always accompanied by tongue root ancement. If tongue root advancement is always and y a *by-product* of *tension*, however, there would ear to be no way, in Ladefoged's feature scheme, her, of handling pharyngeal expansion as an indedent phonological factor. It is curious that lefoged also does not mention Cambodian in his work does not appear in his language index); nor does cite Henderson's (1952) article.

Before the problem of whether an extra feature uld be added--and, if it should, what its specifiions should be--can be settled, three separate but ated questions should be answered:

(1) Is a consistent auditory impression of tenseness gained only from articulations involving tongue tension? If so, 'tense' sounds from any other source would be ruled out, by definition. If not, tenseness would

not be inextricably connected with tongue root advancement--it could also come from pharyngeal tightness--and, accordingly, expansion and contraction could have independent status.

(2) Can pharyngeal expansion be viewed as phonologically independent?

(3) Can pharyngeal contraction be viewed as phonologically independent?

The answer to (1) appears to be negative: a consistent auditory impression of tenseness can be gained either from tension in the tongue muscles or from tightening of the pharynx (as in Sre). The answer to (2) is affirmative; e.g. Cambodian. And the answer to (3) is affirmative; e.g. Sre.

What seems to be needed is a way of accommodating within the universal feature system three different and partially independent phonological parameters. First there is tenseness resulting from the bunching up of the tongue muscles. In addition, and independent of tongue tenseness, the tongue root can move forward from neutral position--expanding the pharyngeal cavity to produce the characteristically deep, full, 'sepulchral' sound; or it can retract from neutral position--narrowing the pharyngeal cavity to produce a sound varying from tense to tight to choke

The implications, for the universal phonological framework, would seem, then, to be as follows:

i. *Keep* Ladefoged's feature of *tension*;

ii. *Keep* Chomsky and Halle's feature *covered* to represent all degrees of phonologically significant pharyngealization; and

iii. *Add* the feature *expanded* to cover all degrees of phonologically significant tongue root advancement. (This feature could accommodate both the register languages of Southeast Asia and those West *African languages* which use this feature in vowel harmony sets.)

The table below is meant to suggest some ways in ch different languages might exploit these fea- es.

	TENSE	COVERED	EXPANDED
English i	+	0	0
English ɪ	-	0	0
Cambodian e	0	0	-
Cambodian è	0	0	+
Akan 'raised' vowels	0	-	+
Akan 'unraised' vowels	0	+	-
Sre i	+	-	+
Sre e	+	+	-

REFERENCES

Abercrombie, David. 1967. *Elements of General Phonetics*. Chicago.

Chomsky, Noam and Morris Halle. 1968. *The Sound Pattern of English*. New York.

Henderson, Eugenie J. A. 1952. The Main Features of Cambodian Pronunciation. *Bulletin of the School of Oriental and African Studies* 14.149-174.

Ladefoged, Peter. 1971. *Preliminaries to Linguistic Phonetics*. Chicago.

Manley, T. M. 1972. *Outline of Sre Structure*. Honolulu.

Pike, Kenneth L. 1967. Tongue Root Position in Practical Phonetics. *Phonetica* 17.129-140.

Stewart, J. M. 1967. Tongue Root Position in Akan Vowel Harmony. *Phonetica* 16.185-204.