

PHONATION IN SOMALI PHONOLOGY

Martin ORWIN

This paper demonstrates the inadequacy of assuming the binary distinctive feature (\pm voice) in an explanatory investigation of Somali phonology. The feature (\pm spread glottis) is shown to be explanatorily adequate, overcoming the problems associated with (\pm voice).

Ce papier démontre que la supposition du trait distinctif binaire, [\pm sonore], dans une enquête explicative de la phonologie du Somali est insuffisante. Il sera démontré que le trait distinctif [\pm glotte large] ([\pm spread glottis]) est explicatif et franchit les problèmes associés au trait distinctif [\pm sonore].

In this paper, the symbols used to represent phonological segments are the letters of the Somali alphabet.

In Crystal's Dictionary of Linguistics and Phonetics, phonation is defined as being "A general term in PHONETICS to refer to any vocal activity in the LARYNX whose role is one neither of INITIATION nor of ARTICULATION" (Crystal, D. 1985 p. 227). In a Somali context, therefore, the phonation of a particular sound is that aspect of the sound which is generally termed voice or voicelessness. Thus, the sound /b/, as in the word 'biyo' "water", may be described as voiced, whereas the sound /sh/ in the verb 'sheeg', "to tell", is a voiceless sound. In this paper, I shall demonstrate how these phonation specifications, voice and voicelessness, are inadequate for explaining the phonology of Somali. An alternative feature specification, which proves to be more explaining the phonology of Somali. An alternative feature specification, which proves to be more explanatorily adequate for Somali, will be proposed, based on the ideas of Kim, C. —W. (1970) and Halle, M. and Stevens, K. N. (1971). The feature will be a binary distinctive feature, a type of feature assumed in much of the generative phonology literature. As a starting point for

investigation, however, the binary feature [\pm voice] will be assumed to be the feature specifying phonation in Somali.

The data which is of concern here is that which displays distinctive phonological contrast in terms of phonation. Such contrast is only found among the consonants in Somali, and then only between the following pairs of consonants: /t/ & /d/, /k/ & /g/, /x/ & /c/. These pairs fit into the stop and fricative inventories of Somali in the following way:

(1)

Stops:

voiced	b	d	dh	g	q	' ¹
voiceless		t	j	k		

Fricatives:

voiced					c	
voiceless	f	s	sh	kh	x	h

A note must be given here on the status of the segment /j/. Although it is an affricate, it has been included in the inventory of stops because of its phonological behaviour. /j/ is never found in syllable final position except in Arabic loan words, for example 'xaj', "the pilgrimage to Makkah" and 'taaj', "crown". Leaving such special marked cases aside, /j/ may be said to behave in the same way as /t/ and /k/ which, as will be assumed, the affricate is underlyingly a stop and becomes an affricate due a later default rule.

From the stop inventory one can see that there are six voiced stops and three voiceless stops. This immediately suggests that as far as the stops are concerned the voiceless stops are the marked set. However, as far as the fricative inventory is concerned, the voiced set is the marked set. Assuming the ideas of underspecification theory², it is impossible to have a binary feature marked for both values underlyingly; that is to say, the feature [\pm voice] may not be set up underlyingly both as [+voice] for the voiced fricative and [-voice] for the voiceless stops. One feature value only must be assumed to be marked underlyingly for all segments specified for that feature. A decision must be made about the value of the feature specification: which value is to be assumed to be marked underlyingly? In

1. The apparent discrepancy of placing the glottal stop, which is a voiceless stop par excellence, will be returned to later. It does, in fact, constitute a further argument in favour of the analysis proposed here.
2. See Archangeli (1984).

order to arrive at a decision let us look at the behaviour of the voiceless consonants.

The most striking aspect of behaviour is the restriction on the voiceless stops set out in the following Somali phonological constraint:

(2) Voiceless stops may not occur in syllable final position³.

When an underlying voiceless consonant does arise in syllable final position it becomes the equivalent voiced stop. For example, the verb with the imperative form 'durug' "to move oneself", in Somali is represented underlyingly as /duruk/. This is apparent from the 3rd person masculine singular form of the simple past of the verb, 'wuu durkay', "he moved himself". In the 3rd person feminine singular form of simple past, however, the underlying /k/ is at the end of a syllable and thus the /k/ surfaces as a /g/, 'way durugtay' "she moved herself". Potential violation of the constraint in (2) may, then, be resolved by the following rule:

(3) An underlying voiceless stop in syllable final position becomes voiced.

Another way of looking at this is in terms of syllable final position being a position of neutralization. Since it is the voiced stop which surfaces, this must be assumed to be the unmarked specification, and the voiceless specification the marked one. Thus, on the evidence from the stops of Somali, it is the [-voice] specification which is the marked specification.

Turning to the fricatives, this conclusion does not seem to be appropriate when the inventory is considered on its own, since there are many more fricatives specified as [-voice] than as [+voice]. However, in contrast to the behaviour of the stops there is no positional constraint relating to the fricatives. All fricatives whether voiced or voiceless may occur in all positions in Somali. The behaviour of the fricatives, then, provides no counter-evidence to the assumption of [-voice] being the marked phonation specification in Somali.

Having now ascertained the marked phonation feature in terms of the feature [\pm voice], attention will be turned to the phonetic realizations of the stops in Somali. When these are examined it

3. Again, as in the case of /j/, Arabic loan words provide what might be seen as counter-examples to this constraint. For example, the word 'fikrad', "idea", has a syllable final /k/. Such examples, however, will not be regarded as counter-examples since they only occur in the special group of Arabic loan words.

becomes apparent that the specification [-voice] as the underlying marked values is not appropriate.

It is generally recognized that the voiced stops in Somali exhibit little voicing. Armstrong, for example, says the following about the segment /g/ :

(4) "g" has not much voice initially. In a number of kymograph tracings made by Haji Farah no voice at all is recorded initially... The following subsidiary members of the phoneme occur and may all be represented by g :

1) A weak king of k with before no release ;

2) Voiceless (or with slight voicing) and with no release ; or k with glottal closure and release, finally...". (Armstrong, L. E. 1934 p. 9).

This description of the behaviour of /g/ is representative of the rest of the voiced stops (see Armstrong, L. E. 1934 p. 6-11 for further details and examples). From this description it is clear why the feature [-voice] would be inappropriate. Since the major characteristic of segments specified as [-voice] is voicelessness itself, the fact that the "voiced" sounds may be described as being voiceless in certain positions is an anomaly.

It is, however, the description of the phonetic implementation of sounds in Somali which provides a clue to a solution to the problem of which feature is appropriate.

It is generally recognised that voiceless stops in Somali are accompanied by rather strong aspiration. This is also mentioned by Armstrong who says of the sound /k/ : "Aspirated rather strongly" (Armstrong, L. E. 1934 p. 9). Aspiration itself, however, is not a suitable distinguishing feature marking the "voiceless" sounds.

If aspiration were assumed to be the marked feature, attention would need to be turned to the pair of fricatives /c/ and /x/. If aspiration is to be the phonation feature, then it must be assumed that /x/ is also marked for this feature. Since this is a fricative, aspiration itself may not seem a very suitable feature, given the tendency for aspiration to be a phonatory aspect normally associated with stops. It is possible to have aspiration with consonants other than stops but it is still highly inappropriate, given the nature of the fricative in question here. The pharyngeal fricative is so "breathy" in its phonetic realization is concerned ; that is to say, the "breathiness" associated with aspiration is not audible, given the already very breathy nature of the voiceless pharyngeal

fricative, /x/. Aspiration, as such, is not, therefore, an appropriate feature either.

In order to ascertain a more suitable feature, the articulatory phonetics involved in the production of aspiration will now be examined. In the earlier general phonetic literature, aspiration was regarded as a function of voice onset time (or the time lag between release of a stop and initiation of voice). For example, Abercrombie, D. (1967) states "Aspiration, in other words, is a period of voicelessness that follows the voiceless closure phase of a stop" (Abercrombie, D. 1967 p. 148). This matter has been discussed by Chin-Wu kim in an article, Kim reviews traditional ideas of aspiration, including the idea that it is a function of voice onset time, and that the breathiness is the result of glottal friction. He then goes on to provide a new definition of aspiration. The two major points of this definition are as follows. Firstly, aspiration is a function of the width of glottal opening ; thus "if a stop is n degree aspirated, it must have an n degree glottal opening at the time of release of the oral closure" (Kim, C. -W; 1970 p. 111). The second point is that turbulence in the vocal tract which provides the breathiness of the aspirated consonant "is created not at the glottis but at the point of constriction for the following vowel whose configuration is formed, through coarticulation, during /h/" (Kim, C. -W. 1970 p. 111).

Given this definition of aspiration, it is possible to propose a feature which is manifested, in certain positions, by aspiration. Such a feature, named [\pm spread glottis], was suggested by Halle and Stevens in "A Note on laryngeal Features" (see bibliography). It is this which will be assumed for Somali as a distinctive feature. Underlyingly, then, the stops /t/ and the fricatives /f/, /s/, /sh/, /kh/ and /x/ will be marked [\pm spread glottis]. The "voiced" sounds, on the other hand, will be specified as [-spread glottis]. Although this is not an underlying feature value, it is added to the feature specification of relevant segments by a default rule.

Contrary to the feature [\pm voice], this feature explains various aspects of Somali phonology, some of which will now be mentioned. Looking again at the above description of the [-spread glottis] ("voiced") sound /g/ cited from Armstrong, the various phonetic realizations of the sound may be explained. The fact that this sound may be pronounced as voiceless is no longer problematic, since the distinguishing feature is no longer [\pm voice]. Another aspect mentioned by Armstrong, and readily apparent to anyone listening to

Somali, is the lack of release of final stops, all [-spread glottis] 4. This may also be explained by the assumption of the feature [±spread glottis]. Since a major part of the phonetic realization of the [±spread glottis] stops is aspiration, then it follows that a major aspect of the phonetic realization of [-spread glottis] is a distinctive lack of aspiration; hence the fact that they are unreleased, preventing any possibility of aspiration. This is also confirmed in Armstrong's description of the variation which includes release, since, in conjunction with the release of the stop, glottal closure is apparent (see (4) above). This is an aspect of the sound, which follows from the assumption of the feature specification [-spread glottis], since glottal closure is the least wide or narrowest configuration of the glottis possible.

This mention of glottal closure brings us to the matter of the glottal stop. One problem for a system assuming the feature [±voice] was that in Somali the glottal stop behaves phonologically as part of the natural class of what were described above as voiced stops when, in fact, it cannot possibly be voiced during its articulation (see footnote 1). This is because of the fact that glottal stop is articulated at the glottis and brings together the vocal folds in such a way as to prevent them from vibrating, the action required to produce the voicing of "voiced" stops. Given the feature assumed here however, [±spread glottis], the glottal stop is specified not for voice but for width of glottal opening, and since the glottal stop cannot possibly be specified [±spread glottis], and must be specified [-spread glottis] it groups together naturally with the other [-spread glottis] stop.

In conclusion, I hope to have demonstrated how unsatisfactory the feature [±voice] is in explaining phonation facts of Somali. The feature [±spread glottis], on the other hand, does provide explanations for these problems in a satisfactory way.

4. This is due to the constraint given in (2) which must now be reformulated as follows:
Stops specified [+spread glottis] may not occur in syllable final position.

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