VOICING CONTRASTS IN SHONA: TOWARDS AN ACCOUNT OF CONSONANT MUTATIONS

A phonological representation in which voicing is defined acoustically (periodicity) is relatively straightforward, and may be all that is needed in many cases. In some phonological systems, however, voicing seems to also pattern along articulatory dimensions (oral stricture, glottal aperture, etc). Deriving these facts from the representation is not a trivial matter, and remains an unsettled issue in phonological theory (see Botma 2011 for a recent review). In this paper I present an analysis of two intricate patterns of consonant mutations found in Shona (Bantu, S10. Fortune 1984) that sheds new light on this complex issue. I argue that a closer look at Shona phonological system reveals that surface voicing is the (secondary) consequence of at least two underlying articulatory contrasts –Spread Glottis (SG) and Stricture Voicing (SV)[1], and that consonant mutations should be analyzed in terms of these contrastive features.

First, I discuss the relation between laryngeal configuration and voicing, and present three arguments that support the claim that SG is phonologically active in Shona[2]

	CLASS 9/10			CLASS 5	
1.a	$_{10}$**mʱ**asa *mats*	cf. $_{11}$ru-**pʰ**asa *mat*	5. a	$_{5}$**ɓ**adza *hoe*	cf. $_{6}$ma-**pʰ**adza *hoes*
b	$_{10}$**nʱ**ivi *sides*	cf. $_{11}$ru-**tʰ**ivi *side*	b	$_{5}$**ɗ**ama *cheek*	cf. $_{6}$ma-**tʰ**ama *cheeks*
2.a	$_{9}$^{m}**b**ekʰero *crattle-skin*		6. a	$_{5}$**ɓ**ikʰir-o *cooking place*	cf. $_{14}$kʰu-**ɓ**ikʰir-a *to cook*
b	$_{9}$^{n}**d**ikʰi *small (cl. 9)*	cf. $_{1}$mu-**ɗ**ikʰi *small (cl. 1)*	b	[i]$_{5}$**ɗ**o *spots*	cf. $_{6}$ma-**ɗ**o *spot*
3.a	$_{9}$^{n}**z**ive *knowledge*		7. a	$_{5}$**z**iso *eye*	cf. $_{6}$ma-**z**iso *eyes*
b	$_{9}$**nʱ**u *thing (cl.9)*	cf. $_{7}$tʃi-**nʱ**u *thing (cl. 7)*	b	[i]$_{5}$**ŋ**a *chap*	cf. $_{6}$ma-**ŋ**a *chaps*
c	$_{10}$^{n}**d**imi *tongues*	cf. $_{11}$ru-**r**imi *tongue*	c	$_{5}$**r**ur-o *wild person*	cf. $_{14}$kʰu-**r**ur-a *be untamed*
d	$_{9}$^{m}**b**aʋaʋarir-o *intention*	cf. $_{14}$kʰu-ʋaʋarir-a *to intend*	d	[i]$_{5}$**ʋ**u *soil*	cf. $_{6}$ma-**ʋ**u *soils*
4.	$_{9}$^{n}**z**ou *elephant*		8.	$_{5}$**z**uro *evenings*	cf. $_{6}$ma-uro *evenings*

<u>Inventory</u>: Shona has pairs of consonants that contrast only in terms of the laryngeal feature SG (/m/ vs /mʱ/, /n/ vs /nʱ/). A laryngeal component is also clearly involved in the production of other (breathy voiced consonants) (bʱ, dʱ, vʱ) although in this case the nature of the contrast is more complex than a simple laryngeal specification. <u>Voice Onset Time</u>: I provide experimental evidence that voiceless stops are phonetically aspirated, and argue that this reflects an SG specification. This sheds some light on the otherwise puzzling realization of some underlying Cw sequences which surface as affricates [pˣ],

---

[1] This is essentially the same as what is generally referred to as Sonorant Voicing, or Spontaneous voicing in the literature. I use the term stricture voicing here to reflect the fact that it is assumed to be an articulatory feature, associated with the degree of oral constriction, which, along with glottal aperture, controls the amount of air that can flow though the glottis, and hence permits vocal fold vibration.

[2] Subscript digits indicate noun class. [i] represents an epenthetic vowel that is inserted to satisfy minimal word requirements (Mudzingwa 2010).

assuming that SG is involved in frication (Vaux 1998). <u>Class 9/10 mutation</u>: [NASAL] mutation of stem-initial voiceless stops (1) results in breathy nasals, a fact that is straightforwardly accounted for under the proposal.

<u>Second,</u> I discuss the relation between oral stricture and voicing, and present three arguments that support the claim that SV is phonologically active in Shona. <u>Inventory</u>: An SG contrast is not sufficient to capture the Shona's rich inventory of stops, in particular the contrast between breathy voiced ($b^{ɦ}$, $d^{ɦ}$) and voiceless aspirated stops (p^{h}, t^{h}), and the existence of contrastive implosives (ɓ, ɗ) and prenasalized stops (^{m}b, ^{n}d, ^{ŋ}g). I argue that these additional levels of contrast better correspond to SV (Clements and Osu 2002). <u>Class 5 mutation</u>: the mutated counterpart of voiceless stops (5) are implosives, which I take as evidence for an (autosegmental) SV specification of the class 5 prefix[3]. Not surprisingly, stem-initial implosives are themselves not affected by class 5 mutation (6), as their SV specification is redundant with that of the prefix. By the same token, I argue that the class 5 SV specification is redundant when the stem's initial segment is a voiced fricative (7.a) and nasal (7.b), and vacuous when it is a rhotic (7.c) or an approximant (7.d). For vowel-initial stems (8), on the other hand, the addition of an SV feature cannot be considered redundant, as class 5 prefixation causes a voiced fricative to be inserted (Lafon 1984). I take this as evidence for the fact that vowels cannot be specified for SV. <u>Class 9/10 mutation</u>: I propose that NASAL is a special type of SV, and that the realization of the class 9/10 class prefix follows the distribution of SV. For segments that are not underlyingly specified for (but compatible with) SV like voiceless stops (1), an SV specification must be provided for NASAL to be realized (as breathy nasals rather than, say prenasalized voiceless stops). Not surprisingly, for segments that are underlyingly specified for SV (2), the nasal mutation readily obtains, in the form of (pre)nazalization. Vowels are assumed to be incompatible with SV, hence the realization of the class 9/10 prefix as a separate prenasalized voiced fricative (4).

Finally, I discuss some complications relative to voiceless fricatives and labialized segments, which fail to undergo mutation. I propose that the incompatibility of SV with vowels carries over to secondary articulation, and argue that this incompatibility can result either in blocking (C^{w}) or in repair (vowels). I speculate that something similar may be occurring with initial voiceless fricatives, provided that we accept that they may be internally complex (as suggested the so-called "whistled fricatives" (Shosted 2006, Pongweni 1990), which simultaneously involve a tong tip and a lip rounding gestures, and contrast both with [s] and [s^{w}]. I conclude by summarizing the proposed distribution of SG and SV across different types of segments, and discussing how what superficially looks like a simple voicing feature can in fact be the result of fairly complex interaction of several distinct articulatory contrasts[4].

---

[3] Which is consistent with the fact that the class concords are usually phonologically related to the class prefixes, which is [ri-] in class 5, and with the Proto-Bantu reconstruction of this prefix (*ri).

[4] <u>Cited works:</u> **Botma, B. (2011)** Sonorants. *The Blackwell Companion to Phonology*. Oostendorp et al (eds). **Clements, G. N. & Osu, S. (2002).** Explosives, implosives and nonexplosives: The linguistic function of air pressure differences in stops. Laboratory phonology (7), 299–350. **Fortune, G. (1984).** *Shona grammatical constructions*. Harare **Lafon, M. (1994).** Shona Class 5 revisited: A case against *ri as class 5 nominal prefix. *Zambezia* XXI, 51-80. **Mudzingwa, C. (2010).** *Shona Morphophonemics: Repair Strategies in Karanga and Zezuru,* PhD Dissertation University of British Columbia. **Pongweni, J. (1990).** *Studies in Shona phonetics: An analytical review.* Harare: University of Zimbabwe Publications. **Shosted, R. (2006)**. Just put your lips together and blow? Whistled fricatives in Southern Bantu. *Proceedings of ISSP 2006*. **Vaux, B. (1998).** The laryngeal specification of fricatives. LI (29). 497–511.