

## Why should voiceless aspirates cause depression in Nguni?

Nancy C. Kula



Department of Language and Linguistics, University of Essex, United Kingdom  
E-mail: [nckula@essex.ac.uk](mailto:nckula@essex.ac.uk)

### 1. Introduction

Depressor consonants classically lower the tone of a following vowel so that syllables that would otherwise surface with a high tone surface instead with a low tone. Depressors are a predominant feature of Southern Bantu languages such as isiXhosa, isiZulu, SiSwati, XiTsonga, Ikalanga (Lanham 1958, 1960; Rycroft 1980; Mathangwane 1998; Bradshaw 1999), although can also be found wider in the Bantu region. The interaction between the voicing of initials and low tone correlates directly with tonogenesis, where languages that lose a voicing contrast develop a compensatory tone contrast, as is the case in Vietnamese (Haudricourt 1954), for example. Thus, the expected default triggers of tone depression are voiced consonants, although phonetic studies provide conflicting evidence as to whether there is actual voicing or not (Lanham 1958, 1960; Rycroft 1980; Traill, Khumalo & Fridjhon 1987; Jessen & Roux 2002, among others). By contrast, phonological analyses of depressors (Khumalo 1987; Mathangwane 1998; Bradshaw 2003; Strazny 2003; Lee 2015) tend to assume that voicing is involved in depressor effects, with voiceless sounds not expected to be depressors but see (Downing & Gick 2005, Downing 2009, Liu & Kula 2020). Consider the examples in (1) below that show a depressor effect with voiceless aspirates resulting in the blocking of a High Tone Spreading (HTS) rule in XiTsonga. Data are from Baumbach (1987: 53-56) and Lee (2009: 35-36).

#### (1) XiTsonga voiceless aspirate depressors and HTS

a.	NonDEPs	Root	Prefix-Root		Gloss
	r	ribye	í-ribye		'it is a stone'
b.	DEPs	Root	Prefix-Root		Gloss
	ts <sup>h</sup>	ts <sup>h</sup> urí	í-ts <sup>h</sup> urí	*í ts <sup>h</sup> ûrí	'it is a mortar'
	t <sup>l</sup> <sup>h</sup>	ntl <sup>h</sup> amú	í-ntl <sup>h</sup> amú	*í ntl <sup>h</sup> âmú	'it is a trap'
	tj <sup>h</sup>	tj <sup>h</sup> ipá	í-tj <sup>h</sup> ipá	*í tj <sup>h</sup> îpá	'it is a pensioner'
	t <sup>h</sup>	t <sup>h</sup> onsí	í-t <sup>h</sup> onsí	*í t <sup>h</sup> ônsí	'it is a drop'
	k <sup>h</sup>	k <sup>h</sup> oswá	í-k <sup>h</sup> oswá	*í k <sup>h</sup> ôswá	'it is a half portion'

In example (1a), a High tone on the initial prefix vowel /i/ spreads once rightwards across a non-depressor. By contrast, in all the examples in (1b), which have an initial voiceless aspirate, this HTS is blocked, and the High tone must move further afield to the following syllable rightwards. This reflects the incompatibility of a High tone with a voiceless aspirate and, hence, a depressor effect.

Along the voicing continuum, breathy voiced sounds which are informally considered to have both aspiration and voicing are also depressors. Discussion and debate on isiZulu (Khumalo 1987; Traill, Khumalo & Fridjhon 1987), for example, centers around whether we can treat depressors as voiced or breathy. Thus, from most previous studies, having some kind of voicing makes the occurrence of depression more expected and an explanation easier.

In phonological frameworks that have a direct relation between voicing and tone, such as Element Theory (Backley 2011), there is a very strong prediction of mutability between the depressor consonant and the following vowel realized as a depressor effect. Breathly sounds are then treated as having both an aspiration feature, [H], along with [L] for voicing, and by this token are able to cause depression, in the same way that breathly nasals are depressors in XiTsonga and Iklanaga, but their plain counterparts are not.

## 2. The case of Nguni

In this context, it is unexpected that voiceless aspirates are depressors in Nguni (XiTsonga, Ikalanga), since they not only have no voicing feature, but they also have aspiration [H], a non-voicing element which also correlates with High tone. IsiZulu depressors are also clearly phonetically plain voiceless, following Traill, Khumalo, and Fridjhon (1987), adding to the puzzle. In a language like Ikalanga (Mathangwane 1998), the situation is compounded by the fact that there is also a parallel set of aspirates that do not trigger depression, diacritically contrasted as in (2a) contra (2b).

### (2) Ikalanga (Mathangwane 1998)

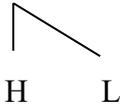
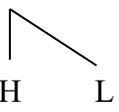
- (a) Non-depressors: plain and labialised aspirates: {p<sup>h</sup>, t<sup>h</sup>, t<sup>h</sup><sub>ɸ</sub>, k<sup>h</sup>, ts<sup>h</sup> k<sup>hw</sup>}
- (b) Depressors: voiceless aspirates: {P<sup>h</sup>, T<sup>h</sup>, K<sup>wh</sup>, TS<sup>h</sup>, Tʃ<sup>h</sup>, (f)}

Given the reclassification of a classic depressor language like IsiZulu as perhaps not having voiced sounds, as the work of Traill, Khumalo and Fridjhon (1987) shows, the question is whether depressors are in fact canonically non-voiced and what this would imply. What then do we make of tonogenesis patterns? Or does this just betray the non-conformity of phonology to phonetics? One approach would be to look in the direction of Derived Environment Effects (Kula 2008, among others), where we can argue that traces of the offending/triggering feature are present in phonology even when they have no phonetic effect, perhaps dependent on their hierarchical position in a feature geometric kind of representation that would allow us to have [H<sup>L</sup>] and [HH<sup>L</sup>] (contra simply [H] and [HH]) as alternative representations of plain voiceless and voiceless aspirates.<sup>1</sup> The analysis builds on the idea of dominant (vertical) dependency vs. branching dependency in Kula (2008), see also Liu (2020). Within the Laryngeal node, which

<sup>1</sup> A reviewer points out that there may also well be phonetic correlations of these alternative representations with perhaps the expectation that the [L] containing voiceless sounds are more likely to trigger breathy voicing in the following vowel. This is an empirical issue that can easily be tested in future work.

is responsible for tone and voicing, there are dependency relations that result in the representations in (3) below, taking the example of /t/. In each case an element in a branching dependent position, as the looser outer shell of the structure, is more likely to interact with a following vowel and therefore result in depression: |L| in a branching dependency position induces a depressor effect. This branching dependency position is what facilitates interaction with tone on a higher tonal tier (see Kula 2012 for discussion). These structures contrast with voiced sounds that have |L| within the core structure or in dominant dependency. In all cases a terminal |L| can trigger depression.

(3) Representations of the Laryngeal node in languages where voiceless aspirates are depressors

<b>Non-depressors</b>		<b>Depressors</b>	
Plain voiceless	voiceless aspirate	Plain voiceless	voiceless aspirate
			
H	H	H L	H L
[t]	[t <sup>h</sup> ]	[t]	[t <sup>h</sup> ]
no branching/ no dependency	Dominant dependency	Branching dependency	Dominant & branching dependency

**3. Conclusion**

This distribution, with different types of plain voiceless and voiceless aspirates, may betray a further enriched typology of voicing at the phonological level, that to some extent mirrors the phonetic voicing typology relying on VOT (Voice Onset Time). Whether this means that at the phonological level, at least, we currently do not have enough nuance in voicing categorization and are rather on a longer voicing continuum than previously assumed, is a matter we must continue to explore.

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