

Positional faithfulness and feature co-occurrence constraints in the height harmony systems of five-vowel Bantu languages

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Height harmony (HH) is a widespread phenomenon in the Bantu languages (Hyman 1999, 2003). It generally consists of the lowering of vowels in suffixes (e.g. causative, applicative, reversive) by vowels in the stem. Where five-vowel (5V; i.e. with the inventory /i u e o a/) languages are concerned, high vowels are lowered to mid vowels by preceding mid vowels. In the majority of cases, the low vowel /a/ neither triggers nor undergoes lowering and is opaque. The particulars differ from language to language but “canonical” HH, displayed by the majority, is additionally asymmetric with regard to rounding (or backness; Hyman 1999:238,245). Specifically, /i/ is lowered after both /e/ and /o/ whereas /u/ is lowered only after /o/. Thus, canonical Bantu HH can, descriptively at least, be split into front (FHH) and back height harmony (BHH).

Many authors treat the canonical pattern as two distinct processes, i.e. separating FHH and BHH, with only BHH being parasitic on [+rd] or [+bk] (e.g. Moto 1989 on Chewa or Nevins 2010 on Kisa). However, Beckman (1997), in her analysis of canonical 5V Bantu HH in Shona, does no such thing, using instead the following faithfulness and feature co-occurrence constraints ranked in the following order: IDENT(lo), IDENT- σ_1 (hi) (= IDENT(hi) in root-initial syllables), IDENT(rd) » *RoLo (= * [+rd, -hi]) » *MID (= * [-hi, -lo]) » *HIGH (= * [+hi, -lo]) » IDENT(hi). One detail that is key to Beckman’s analysis is the stipulation that, where possible, adjacent vowels share Aperture or VPlace nodes. Thus, [e·e] incurs just one violation of *MID and [o·o] incurs just one violation of *RoLo. That being the case, the fact that IDENT- σ_1 (hi) is undominated but that *MID dominates *HIGH produces lowering after /e o/ but not after /a/. Moreover, since *RoLo dominates *MID and *HIGH, [e·o] is ruled out as a possible sequence and [e·u] surfaces in its place.

Here I apply Beckman’s work on Shona to four further patterns of HH found in 5V Bantu languages, discuss the problems this encounters and show that is ultimately to unsuitable for all cases. Hyman (1999:236–46) presents an extensive, mainly descriptive survey of the variation found in height harmony within the Bantu languages (as an introduction to a historically-minded discussion). This study comprises five case studies that represent a subset of the variation found in the Bantu family as a whole (but the vast majority of 5V HH systems and a significant proportion of all Bantu languages with HH). This is part of an ongoing effort to construct a larger, more comprehensive analytical typology of HH in the Bantu languages.

Table 1 below provides the patterns that are the objects of study. The name of each language is accompanied by an identifying Guthrie code (following Maho 2009). For each example, the left-hand column shows FHH contexts and the right-hand BHH contexts. Underlining is used to highlight instances where HH does indeed effect a change in vowel height.

Punu (B.43)	Lozi (K.21)	Shona (S.12)	Pende (L.11)	S. Kongo (H.16a)
i·i i·u	i·i/e i·u	i·i i·u	i·i i·u	i·i i·u
u·i u·u	u·i/e u·u	u·i u·u	u·i u·u	u·i u·u
e·i e·u	e·i/e e·u	<u>e·e</u> e·u	<u>e·e</u> e·u	<u>e·e</u> <u>e·o</u>
o·i o·u	o·i/e <u>o·o</u>	<u>o·e</u> <u>o·o</u>	<u>o·e</u> <u>o·o</u>	<u>o·e</u> <u>o·o</u>
a·i a·u	a·i/e a·u	a·i a·u	<u>a·e</u> a·u	a·i a·u

Table 1: Height harmony systems in 5V Bantu languages

As discussed by Hyman (1999:236–46), the pattern found in Shona is overwhelmingly the commonest found in 5V Bantu languages; few Bantu languages have systems such as those found in Punu, Lozi and Pende (incidentally, there are no reported cases of a Bantu language with a reversed Lozi system, i.e. lacking BHH but possessing FHH); and the symmetric pattern displayed by S. Kongo is exceedingly rare, being limited to closely related varieties.

In the analyses of the patterns in Table 1, feature specifications assumed for vowels follow Beckman (1997:8): /i/ = [+hi, -lo, -rd, -bk], /u/ = [+hi, -lo, +rd, +bk], /e/ = [-hi, -lo, -rd, -bk], /o/ = [-hi, -lo, +rd, +bk], /o/ = [-hi, +lo, -rd, +bk].

Firstly, the system to which Beckman's analysis is most easily adapted is that of S. Kongo, in which HH is symmetric. This is done by simply demoting *RoLo from a high- to a low-ranking position, allowing underlying /e·u/ to surface as height-harmonic [e·o].

The ranking of constraints is also relatively easily adapted for Punu, which lacks height harmony, by placing IDENT(hi) between *MID and *HIGH. This does not produce lowering of high vowels by mid vowels. However, this does require limiting mid vowels in the input to initial syllables (assuming multiple linking as in Beckman's analysis of Shona; as mid vowels in Punu are restricted to root-initial position).

In Lozi, since [e·o] is disallowed, either *RoLo or IDENT(hi), or both, must rank higher than *HIGH and, as lowering is lacking in all but one context, namely /o·u/, IDENT(hi) should rank higher than *HIGH. However, for /o·u/ to surface as [o·o] rather than [o·u], IDENT(hi) paradoxically needs to be ranked lower than *HIGH.

For Pende, ranking *HIGH above *MID ensures that the sequence /a·i/ surfaces as [a·e]. However, this also incorrectly predicts that /a·u/ should surface as [a·o]. The ranking of *HIGH higher than IDENT(hi) means that /o·u/ surfaces as [o·o] but *RoLo prevents /e·u/ from surfacing as [e·o], giving [e·u] instead. One potential solution to the problems encountered in analysing the Pende system may be to treat FHH as a raising process separate from a lowering BHH process.

This study shows that Beckman's (1997) analysis of HH in Shona cannot be easily adapted to cover the complete subset of HH dealt with here and thus is not readily generalisable to the Bantu languages as a whole. Further work will expand the number of HH systems included in the set (principally seven-vowel Bantu languages), explore the possibility of an inclusive theoretical analysis and also investigate the potential role of phonetic grounding in the creation of phonological patterns such as those discussed above, especially the prevalence of asymmetry.

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