Stem Consonant Cooccurrence Restrictions in Ngbaka

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1. Introduction

Ngbaka is one of the languages spoken in the Central African Republic.[1] It is part of the Adamawa Ubanguian branch of the Niger-Congo language family. The root cooccurrence restrictions in this language have attracted considerable attention since they were first reported by Thomas (1963) (see Wescott 1965; Chomsky and Halle 1968: 387; Clements 1982; Itô 1984; Churma 1984; Herbert 1986: 113-16; Mester 1986: 32-45; Sagey 1986: 260-66; Mester 1988; Lombardi 1990: 376 (fn. 2), among others). In Ngbaka there are vowel cooccurrence restrictions (not discussed here) and restrictions on the occurrence of consonants with the same point of articulation. The latter are stated below (from Wescott 1965, who summarises Thomas 1963: 63ff.):

(1) (...) if a disyllabic word contains a voiceless consonant, it does not also contain the voiced counterpart of that consonant (that is, /p/ excludes /b/, /s/ excludes /z/, etc.). Similarly, if a disyllabic word contains a voiced obstruent, it does not also contain the prenasalized counterpart of that obstruent (that is, /b/ excludes /^{m}b/, /z/ excludes /^{n}z/, etc.); if such a word contains a prenasalized obstruent, it does not also contain the corresponding nasal (that is, /^{m}b/ excludes /m/, /^{n}z/ excludes /n/, etc.). (Wescott 1965: 346)

The consonant inventory of Ngbaka is given below (see Thomas 1963: 55):

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(2)

vcl obs	p	f	t	s		k	kp	
vcd obs	b	v	d	z		g	gb	
glottalised	'b							
prenasal	mb		nd	nz		ŋg	ngb	
nasal	m		n		ɲ			
glide					j		w	
liquid				l				
glottal stop								ʔ
glottal fricative								h

Ngbaka has seven oral and three nasal vowels (/i e ɛ a ɔ o u ã ẽ õ/) and three tones (high, low, and mid – the latter of which is not marked in this paper).

The rest of this paper is organised as follows: in § 2 I briefly discuss one previous formal account (that of Mester 1986) of the Ngbaka cooccurrence restrictions. In this paper I will focus exclusively on *labial* stop consonants. In § 3 I argue for a re-analysis, on the basis of a fresh inspection of the data. This analysis makes use of a principle of 'sufficient dissimilarity', which is subsequently argued to play a role in other phonological analyses as well (§ 4).

2. *Previous analyses: Mester (1986)*

Mester (1986: 45) makes explicit that the restrictions stated in (1) are bidirectional, for instance 'both **b* + *mb* and **mb* + *b* are excluded'. He points out that the consonant cooccurrence restrictions can be expressed in a gradation series, as in (3) below, where adjacent elements exclude each other, while non-adjacent elements are compatible:

(3) p - b - mb - m

Identical consonants are permitted root-internally (such as in pɛ́pɛ́ 'downstairs', bìbi 'simply', mɔmɔ 'to stick, etc.'). Thus, according to the Thomas-Wescott generalisation, three of the six possible combinations of different labial stop consonants should be acceptable and three should be excluded:

(4)
* p - b
p - mb
p - m
* b - mb
b - m
* mb - m

Mester points out that this is the reason why 'it is crucial to regard the elements of the nasal contour as underlyingly unordered with respect to each other' (*ibid.*). Thus, Mester represents the features [+nasal] and [-nasal] on separate tiers, as in (5):

(5)
$$\begin{array}{c} [-\text{nasal}] \\ | \\ \text{C} \\ | \\ [+\text{nasal}] \end{array}$$

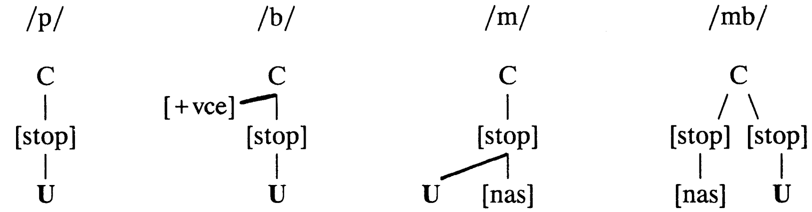
Such a conception of prenasalised stops is quite unconventional (see Sagey 1986), and has a number of undesirable empirical consequences. For instance, it would predict that vowels can be nasalised regardless of whether they occur *before* or *after* a prenasalised stop. However, it is *never* the case that vowels are nasalised both before and after, or exclusively after, a prenasalised stop, while there are languages in which they are exclusively nasalised *before* the prenasalised stop, that is on the 'nasal side' of the segment. An 'unordered' representation of prenasalised stops like that in (5) does not account for this discrepancy.

In the next section I turn to a possible re-analysis of the facts that does not depend on a conception of prenasalised stops as non-contour segments. We will see that this analysis makes a number of predictions that appear to be borne out by the data.

3. Alternative analysis: sufficient dissimilarity

A formal expression of the Ngbaka restrictions must take into account nasality, voicing, and place of articulation. I will assume the representations of the relevant segments as in (6) below. These representations were proposed in van de Weijer (1993, in preparation), with the modification that prenasalised stops are not assumed to involve a special kind of dependency (as in van de Weijer 1993), but rather consist (simply) of a nasal and a stop under a single root node.

(6)



The distinction between /p/ and /b/ is solely one of voicing; I will assume that the distinction is privative at the underlying level. The representation of the nasal with [nasal] under [stop] is argued for in van de Weijer (1992); there is no voice specification for all sonorants in Ngbaka are redundantly voiced (see (2) above). Prenasalised stops are also predictably voiced in this language.

Consider a hypothetical root with the consonantism /p-b/. The underlying representations of these two stops differ only by a single feature: /b/ has [+voice], a feature which /p/ lacks. Apparently, this difference is too small for the root to be acceptable. It is therefore ruled out (*/p-b/). Similarly, the consonants in a hypothetical root /mb-m/ differ only by one feature (the additional [stop] in the prenasalised stop), and is non-attested (*/mb-m/).[2] I will therefore postulate the following hypothesis to account for the observed patterns:

(7) *Ngbaka cooccurrence restriction: sufficient dissimilarity*
Root consonants, if they are both labial stops, must differ by more than one feature to be acceptable in Ngbaka, or they must be completely identical

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[2] Note that in the case of the alveolars, there are two prenasalised obstruents, /^{n}d/ and /^{n}z/ (see (2)), both of which are ruled out in a root with /n/, according to the Thomas/Wescott generalisation in (1).

The 'sufficient dissimilarity' account makes the same prediction because /^{n}d/ and /^{n}z/ are not different with respect to their 'feature count': where /^{n}d/ has [stop] to represent its oral part, /^{n}z/ has [cont] (see van de Weijer in progress). Hence, a hypothetical root /n-^{n}z/ differs only for one feature (the additional [cont] in the prenasalised fricative), and is predicted to be ill-formed by the hypothesis formulated in (7) below, just like */^{m}b-m/.

The hypothesis in (7) accounts for the two cases mentioned above. The other four cases are /p-mb/, /p-m/, /b-mb/ and /b-m/. Note that glottalised /b'/ patterns with non-glottalised /b/.

The representations in (6) predict that /p-mb/ should be well-formed, since the two consonants differ by two features (e.g. pɛ̀mbɛ̀ 'painter'). As for a root with the consonantism /b-m/, this is correctly predicted to be well-formed, since /b/ is specified for [+voice], and /m/ is specified for [nas] (e.g. mò.béè 'behind each other', 'bɔmɔ 'to pinch'). These predictions follow the generalisation in (1) above.

With respect to a hypothetical root /p-m/, however, it is predicted that this should be *ill-formed*, in contradistinction to what was assumed in (1) above, since the consonants in this root differ underlyingly only for a single feature, just like /p-b/. As a matter of fact, a search through the Ngbaka sources available to me (Thomas 1963; Maes 1968; Samarin 1965; Sevy 1972; Arom and Thomas 1974; Derive 1975; Derive *et al* 1975), revealed *only a single* instance of a root with /p-m/, namely pàmɛ̀ 'marsh swine' (Derive 1975: 153). This item does not occur in the dictionary of the language in Sevy (1972) nor in the dictionary of Maes (1968). I will therefore tentatively conclude that roots with /p-m/ are ill-formed, and that the hypothesis stated above is not violated.

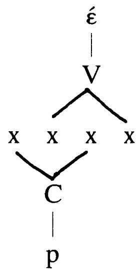
Also in contradistinction to what has been so far assumed in the literature, a hypothetical root with the consonants /b/ and /mb/ is predicted to be *well-formed*, since the underlying representations of these consonants differ for two features. The available sources on this language revealed a considerable number of monomorphemic lexical items with the root consonants /b/ and /mb/ (all in that order). The occurrence of such roots is pointed out by Thomas (1963: 63), who regards them as 'exceptions' to the statement in (1). A number of these roots are listed below:

(8)	'bɛ́mbɛ	'to guard'
	bõmbò	'to rock'
	bɔ̌mbɛ	'front'
	bɔ̌mbíà	'calf (of leg)'
	'bɔ̌mbɔ́	'chance'

Under my account, these forms are not exceptions. Rather, they support the generalisation that in Ngbaka labial stop consonants must differ by minimally two features to be acceptable.

Finally, two identical labial stop consonants may appear in a Ngbaka root. In that case, I postulate a representation like the following (for instance, for the root pɛ́pɛ́ 'downstairs'):

(9)



4. Repercussions

The analysis presented in the previous section hinges crucially on the idea that two consonants in a stem may not be too much alike. If two consonants are stops with the same place of articulation, they either have to be sufficiently dissimilar (formalised as a difference of more than one feature), or they have to be completely identical. This analysis appeals to a principle of 'sufficient dissimilarity'. In this final section I will present another case in which a principle of a similar kind plays a role, to show that appealing to such a notion is not especially designed for this analysis.

4.1 Onset restrictions in English. In this section I show that other constraints besides that in (7) make reference to minimal differences in a certain dimension in a certain domain. This concerns minimality constraints in sonority distance between onset consonants in many languages, English for instance.

The following sonority hierarchy can be established for English consonants (see e.g. Selkirk 1982):

(10) p s n l,r j
→ increasing sonority

The issue of whether such a hierarchy can be derived from other factors is not at stake here, nor is the question whether sonority hierarchies are language-specific or (partly) universal.

In English, onsets like /ps-/ or /pn-/ are disallowed, while onsets like /pl-/, /pr-/ and /pj-/ are allowed. This can be expressed by stipulating a condition that there must be a certain minimal sonority distance between two consonants in an onset: this distance is sufficient in the case of /pl-/, etc., but not sufficient in the case of /ps-/ and /pn-/.

In other words, the consonants in a certain domain (the onset) in English have to be sufficiently different with regard to one aspect of their representation (their sonority value). This is exactly the same kind of statement as that which was made for Ngbaka above (see (7) above). Hence, analyses in terms of minimal distance constraints offer a precedent for appealing to a notion of sufficient dissimilarity in phonological analyses. Other analyses of syllable structure conditions that appeal to minimal sonority distance restrictions can be found in Harris (1983) for Spanish, van der Hulst (1984) for Dutch, and, more recently, Davis (1990) for Italian.

Note that a difference with Ngbaka is that in Ngbaka *identical* consonants are permitted in a root. In the onsets of the languages for which minimal sonority requirements have been postulated, there is no such option (i.e. English does not allow initial geminates like /pp-/, etc.). It is therefore predicted that languages that do allow initial geminates (in which case there would be a sonority distance of zero in the onset), cannot impose any minimal sonority distance requirements on their onsets.

5. Conclusion

In this paper I have reconsidered the root consonant restrictions in Ngbaka. The original generalisation uncovered by Thomas (1963) may need emendation in the light of a re-examination of the available sources. If the generalisation should be stated in terms of a sufficient dissimilarity principle, the account given here is empirically more adequate than previous ones. Finally, we have seen that such a principle plays a role in analyses in another phonological domain as well, namely onset restrictions in English and many other languages.

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