On the ambiguous segmental status of nasals in homorganic NC sequences

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A fundamental problem in the analysis of pre-nasalized segments is to determine whether these homorganic nasal-obstruent (NC) sequences are, in fact, best considered unit segments or clusters. The segmental status of NC sequences is hard to resolve because, as work like Maddieson & Ladefoged (M&L 1993) shows, few languages have a phonological contrast between intervocalic pre-nasalized segments and NC clusters. There is also no consistent phonetic distinction between pre-nasalized segments and NC clusters. As a result, the decision about their segmental status is typically motivated by assumptions about surface structural markedness rather than surface contrast.

This problem is highlighted by the analysis of pre-NC lengthening (Pre-NCL), a process commonly found in Bantu languages. In LuGanda, for example, where vowel length is otherwise contrastive (1a), only long vowels are found before homorganic NC sequences, both morpheme internally (1b) and across morpheme boundaries (1c):

   (a) -mala ‘finish’ vs. -maala ‘smear’
   (b) –taanda ‘betray’ (*-tanda)
   (c) mu-temuzi‘murderer (cl.1)’ vs muu-mbowa ‘executioner (cl.1)’

Since work like Clements (1986), pre-NCL in Bantu languages has been analyzed as a form of compensatory lengthening. The NC sequence is a cluster in the input (2a). As Bantu languages are said to allow only open syllables, the NC sequence must be syllabified as a (non-moraic) Onset. To avoid violating the Sonority Sequencing Principle, the NC must become a unitary pre-nasalized segment on the surface (2b). The vowel lengthens to compensate for the loss of the segmental status of the nasal, taking over its timing unit (Clements 1986; Hubbard 1995; Hyman 1992; Schadeberg 1991; van de Weijer 1996; etc.):

(2) (a) Input to lengthening (b) Output

While this analysis provides a plausible motivation for Pre-NCL, linking the nasal’s loss of segmental status to syllable markedness, it has the obvious disadvantage that it derives an output series of marked, pre-nasalized segments not found in the input inventory.

In this paper, I argue Pre-NCL is non-compensatory, and the nasal has output segmental status, syllabified in coda, as in (3). As I show, (3) best accounts for other phonological and phonetic properties of the VNC sequence. Further, the evidence Bantu languages only have open syllables – so NC sequences must be single segments - is not compelling.

(3)

The analysis in (2) suggests that Pre-NCL is inherently linked to the loss of segmental status of the nasal. This predicts Pre-NCL will only be found before derived pre-nasalized consonants. However, lengthening before homorganic NC sequences is reported for Early Middle English (Jones 1989, Phillips 1981, Ritt 1994), Malay (Onn 1980) and Delaware (Herbert 1986) where the NC sequences are described as clusters, the nasal syllabified in coda position. As Phillips (1981) and Jones (1989) argue, Pre-NCL plausibly results from phonologization of the phonetic lengthening of syllables containing nasals homorganic with a following voiced obstruent. The representation in (3) captures the similarity between the context for Pre-NCL in Bantu and in other languages; the analysis in (2) does not.
The analysis in (2) also incorrectly predicts that long vowels derived by Pre-NCL should pattern phonologically with lexical long vowels as they have the same output representation. However, work like Hyman (1992) shows that, while in Bantu languages like LuGanda (4a) both pre-NC long vowels and lexical long vowels count as bimoraic for mora-counting tone processes, in languages like Runyambo (4b) pre-NC long vowels count as monomoraic and lexical long vowels count as bimoraic:

(4) Tone assignment to second mora (adapted Hyman 1992, figs (6), (11))
   (a) a-lagíra ‘he who commands’ vs. a-geénda ‘he who goes’ a-liíma ‘he who spies’
   (b) tu-rim-ir-e ‘we cultivated’ tu-jeenz-ir-e ‘we went’ vs tu-siíj-ir-e ‘we smeared’

This distinction can be accounted for straightforwardly by the representation in (3). In languages like Runyambo (4b), tones associate only with moras exclusively dominating vowels. In languages like LuGanda (4a), tones are not so constrained. (In both types of language, though, tone is phonetically realized only on vowels.) The representation in (3), but not the one in (2b), also accounts for the fact that vowels are nasalized in many Bantu languages before NC sequences but not before plain nasals (Herbert 1986, M&L 1993).

Cross-linguistically vowels are more likely to nasalize before coda nasals than ones which are onsets of the following syllable.

If the evidence supporting (2b) is weak, why then are NC sequences that are the output of Pre-NCL usually described as surface pre-nasalized segments, not heterosyllabic clusters? The main argument is that NC sequences are the only consonantal sequences, and they are only found word-internally. From this work like Herbert (1986) concludes that the least marked analysis is to propose these languages have only open syllables. However, as homorganic nasals are high in sonority and do not have independent place, they are the least marked coda consonants (Itô 1986; Goldsmith 1989; Zec 1995; etc.). And other languages allow codas only word-internally. (Some Australian languages like Aranda, for example, have this restriction (Strehlow 1942).) As a result, it is not clear that the least marked analysis for Bantu languages is to propose they have only open syllables at the expense of having a marked derived segment inventory.

Another argument for considering homorganic NCs unit segments is that native speakers are reported as pausing before them when asked to divide words into syllables. However, as Harris (in press) argues, many apparent tests for possible syllables actually test for possible prosodic words. This problem is illustrated by a LuGanda language game. NC is treated as a unit with a following vowel in the game, but so are geminate Cs and syllabic N+Cs (underlined), even though there is uncontroversially a syllable break between the halves of the geminate C and between the syllabic nasal and following consonant:

(5) Luganda ‘syllable reversal’ language game (Herbert 1986, p 71, fig. b)
   (a) N^[t]amba[za] ya kinyomo erinnya omuti nga yetiss
       ‘The kinyomo is an audacious chap; he climbs a tree with a load on his back.’
   (b) Zi[i]mbaan^[t] monyikiya nyarie timuo nga ss[setiye.

As Herbert (1986) points out, the units relevant to the game are consistently defined by consonantal place breaks, not syllable breaks. This strategy insures that the output of the game will satisfy the condition that LuGanda words end in vowels while also satisfying constraints on syllable structure.

In sum, homorganic NC sequences triggering Pre-NCL are best analyzed as surface clusters rather than unit segments. If the nasal is often described as the onset of a pre-nasalized segment, not a segment on its own, that is because, as shown in (3), the prosodic and segmental affiliations of the nasal are misaligned. The nasal shares moraicity with the preceding vowel, but segmental properties with the following consonant. Since the nasals are not tone bearing, as expected for moraic segments, they are easily misinterpreted as non-moraic, forming a syllabic as well as segmental constituent with the following consonant.