Overlap-Driven Consequences of Nasal Place Assimilation in Zulu

Claire Halpert (MIT)

In most contemporary theories of place assimilation (Padgett 1994, Jun 2004), the laryngeal composition of assimilating clusters (e.g. mb from /nb/) is irrelevant to the process of assimilation: the formal representation of assimilated [mb] is such that no interaction is expected with laryngeal neutralization. However, interconsonantal overlap is a known factor both in place assimilation (Jun 2004; Kochetov, Pouplier & Son 2007) and in the triggering of laryngeal neutralization (Chitoran, Goldstein & Byrd 2002). Therefore, if place-assimilated clusters like [mb] are represented as overlapped nasal+stop, the process of place assimilation is predicted to increase the likelihood of laryngeal neutralization on the nasal or on the stop. The present study verifies this prediction by contrasting the behavior of assimilated and unassimilated nasal-stop sequences in Zulu (Southern Bantu). The findings support the inclusion of at least two distinct degrees of overlap between consonants in phonological representations.

Zulu exhibits a direct interaction between place and laryngeal features: in NC clusters that undergo place assimilation, implosion and aspiration on C following the nasal are systematically lost (1). In this paper, I examine these and other effects of Zulu place assimilation in NC clusters. I propose that place assimilation takes place through spreading of the place gesture, which in concert with a *LENGTH constraint against lengthening of the place gesture forces a high degree of overlap in assimilated NC structures. I will argue that all of the changes seen in assimilated NC occur to satisfy markedness violations that result from the overlapped structure.

Some Zulu nasals must become homorganic to a following C (2). Others surface with invariant features in all contexts (3). All Zulu N_iC_i clusters where the nasal has undergone place assimilation display secondary effects on C_i. I focus on three effects, shown in (2): de-aspiration of aspirated consonants, affrication of fricatives, and loss of implosion. The presence of these effects in assimilated N_iC_i contrasts with their absence in non-place-assimilated mC clusters, as in (3), suggesting that their occurrence is directly linked to the process of place assimilation. The right theory of place assimilation, then, must predict these various secondary effects.

I propose that in Zulu nasal place assimilation, a high-ranked *LENGTH contstraint forces the place gesture of C to spread onto N without becoming longer. Additionally, intergestural ALIGNMENT constraints (Gafos 2002) require overlap between the place gesture and other gestures of C to be maintained. Since no extra length is added to the place gesture, maintaining overlap between it and other of C's gestures while at the same time overlapping it with N will result in overlap not just between place and N, but between other gestures associated with C and N, as well. This overlap becomes problematic for recovering nasality (cf. Cohn 1993, Silverman 1997, Browman & Goldstein 2000), particularly when it is overlapped by aspiration and glottalization. The interaction between place assimilation and affrication (e.g. nv ⟶mbv) is attributed to the distinct avoidance of nasal continuants (cf. Padgett 1994).

The formal analysis includes *LENGTH, high-ranked recoverability-motivated markedness constraints, the family of ALIGN constraints, as well as gestural faithfulness constraints. Following the results of Chitoran et al (2002), I use a markedness constraint LAR that prohibits more than one laryngeal gesture in overlapped clusters. When *LENGTH, ALIGN, and markedness are ranked high, the result is that the problematic features are deleted from the entire cluster, as with aspiration and implosion (4).

Preliminary evidence for *LENGTH, which predicts that assimilated NC should have the same duration as plain C, was found in recordings made of a Zulu speaker producing C and NC in minimal pairs. While more data is needed in order to refine our understanding of how *LENGTH operates in Zulu, current results show a significant difference between the length of assimilated and non-assimilated clusters, while little to no difference between the durations of assimilated NC and plain C (6).

(1) a. iN + ɓali ⟶imbali ‘flower’
b. iN + tʰando ⟶int’ando ‘free will’

(2) a. iziN + **ʃ** angane ⟶izin**tʃ** angane ‘wanderers’
b. iziN + **kʰ**alo ⟶iziŋ**k**alo ‘ridges’
c. iziN + **ɓ**ambo ⟶izim**b**ambo ‘ribs’

(3) a. um + ɬaba ⟶u**mɬ**aba ‘world’
b. um + tʰetʰo ⟶u**mtʰ**etʰo ‘law’
c. um + ɓala ⟶u**mɓ**ala ‘color’

(4) *Length. Align, Lar, *ɓ̃>> Max(nas) >> Max(implosion)

(5)

/N + ɓ/	*Length	Align	Lar	*ɓ̃	Max(+nas)	Max(imp)
☞ /mb/ (same length as ɓ)						*
/mɓ/ (longer)	*!					
/mɓ/ (same)			*!			
/ɓ̃ɓ/				*!		
/ɓɓ/					*!	

(6)

	/um+m/ [m]	**/iN+m/ [m]**	**/m/ [m]**	/um+n/ [mn]	/n/ [n]
Duration	335ms	**169ms**	**166ms**	272ms	101ms

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