PHONOLOGICAL NASALITY IN LAKOTA

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Ajax Wordshop

It has long been recognized that Lakota has an underlying distinction between nasal and oral vowels. It is also a fact of Lakota that some underlying oral vowels may become nasalized under certain circumstances. This is a matter of no little complexity. Boas & Deloria (1941) discuss it, but only Carter (1974) among recent studies has had the nerve to tackle this phenomenon. This is a complex phenomenon not easily characterized in the linearity of the Chomsky & Halle (1968) (hereinafter SPE) paradigm. Recent innovations in phonological theory, inspired by just such phenomena as assimilations of various kinds, give us more efficient ways of characterizing behavior such as that of nasality of vowels in Lakota.

The following are assumed to be the inventories of Lakota vowels:

(1) Oral

\begin{align*}
i & \quad u \\
e & \quad o \\
a &
\end{align*}

(2) Nasal

\begin{align*}
i & \quad ñ \\
? &
\end{align*}

That some underlying oral vowels may become nasal is shown in the following forms

(3) a. ya 'to go'

'uyapi 'We go'

b. -ya adverbial suffix

šica '(to be) bad'

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It appears here that a nasal vowel will cause a following vowel to become nasalized. Furthermore, this happens in spite of the fact that there is a consonant in the way. This latter aspect is not uncommon, however, as Clements (1985:242) points out, "rules of vowel-to-vowel assimilation frequently include mention of the variable 'C₀', indicating that the assimilation process takes place regardless of the nature or number of the intervening consonants."

The forms in (3) are among the more straightforward examples, however. As the following forms show, nasalization is not allowed to cross other consonants.

(4) a. čąkaya 'a log'
   b. opąya 'to hinder'
   c. čąwaksa 'to saw wood'

As (4) c. shows, this process is blocked even by the other of the two glides in Lakhota: w. The following forms show that only one vowel, the low vowel a, undergoes this nasalization.

(5) a. čąyuktą 'bent wood'
   b. wįyeya 'ready'

Two further aspects of this process show some of the complexity involved. Consider the following forms:

(6) a. kaya 'to make'
   'y-ya-kąyapi uš-you-make
   b. yaxtaka 'to bite one' (ya- 'by mouth')
   'yąyaxtaka 'We bit him'

(7) a. sloya 'to know'
sloyąyapi 'We know him'
The forms in (6) show that the process is morphologically controlled in that vowels in prefixes do not undergo this rule. And the forms in (7) show that a vowel may become nasalized by a nasal consonant that is not by any analysis adjacent to the vowel and further an intervening vowel is not nasalized! These strange circumstances led Carter (1974:247–8) to propose the following rule, "realizing that the formalization is ad hoc":

(8) **NASAL ASSIMILATION:**

\[
\begin{array}{c}
\text{a} \rightarrow [+\text{nas}] / \left\{ \begin{array}{c}
\text{v} \\
+ \text{nas} \\
nV
\end{array} \right\}
\end{array}
\]

**CONDITION:** does not apply in prefixes\(^2\)

Recent changes in phonology may help us to make more sense of this apparently peculiar situation. Let us first see if nasalization proves any more tractable in the framework of Lexical Phonology. That is, can we appeal to level ordering and bracketing information to correctly predict the behavior of the feature [nasal]?

We might first notice a coincidence. This nasalization rule operates inversely in the exact same "territory" as a vowel deletion rule. That is, in phonologically identical situations, nasalization occurs exactly where a rule of vowel deletion fails to apply. Specifically, in forms that have the instrumental prefixes yaːç, yuːç, the vowel of the personal pronoun iːg apparently deleted and resyllabification occurs. Consider the forms in (9) and the respective underlying forms in (10):

(9) a. yaksa "to bite off a piece"
    blaksa "I bite off a piece"
    laksa "You bite off a piece"

b. yuʃka "to untie"
    bluʃka "I untie"
The nasalization rule, on the other hand, works exactly the opposite. Specifically, it applies where the vowel deletion rule does not. It does not apply where the vowel deletion does. Consider once again the forms in (6) above where nasalization does not apply to the instrumental prefixes. Consider also the following forms where nasalization, but not vowel deletion, applies to the causative:

\[
\begin{align*}
\text{nap'yu} & \quad \text{to hear/listen} \\
nax'yu & \quad \text{to cause to listen} \\
nax'uwaya & \quad \text{I cause him to listen} \\
nax'umaya & \quad \text{They caused me to listen}
\end{align*}
\]

In Patterson (1990:147), the rule of vowel deletion was proposed to look thusly:

\[
\begin{align*}
\text{VOWEL DELETION} \\
\begin{bmatrix} i \\ a \end{bmatrix} \quad \text{-----} \quad \emptyset / \quad \begin{bmatrix} [CX] \\ [YX] \end{bmatrix}
\end{align*}
\]

And it was suggested (based on a number of other morphological and phonological factors) that it applies in the following framework:
In order to derive the correct forms, given the rule of VOWEL DELETION in (13) and the framework in (14), the brackets in the VOWEL DELETION rule must be carried over from Level I (where the instrumental prefixes are added) to Level IV. As was shown in Patterson (1990:146-8), the rule of VOWEL DELETION applies only to these prefixes and not to phonologically identical stem initial sequences. If this analysis is correct, it constitutes a serious threat to a crucial principle of Lexical Phonology: Bracket Erasure. There are two versions of Bracket Erasure, the weak version is adopted in Mohanan (1982) and the strong version is argued for in Mohanan (1986:23).

(15) a. BRACKET ERASURE (Weak Version)

Erase the internal brackets at the end of each stratum.
b. BRACKET ERASURE (Strong Version)

Erase the internal brackets at the end of each cycle.

The above analysis is a threat to either the strong or weak version of BRACKET ERASURE.

In order to correctly derive the nasalized forms in this schema, i.e. the framework in (14), we would need to retain the right bracket in the rule in (13) one more level (to Level V where the personal pronouns which trigger nasalization are added) and write the rule of nasalization so that it applies just in case the bracket is not there! It is unlikely that this is the correct direction to be taking. In fact, the whole issue of the above mentioned VOWEL DELETION rule may profit from re-examination in the framework of feature geometry and underspecification.

Another analysis, based on the positions of these sequences, might be proposed. Specifically, nasalization seems not to occur in prefixes (i.e. at the left end of the word) but does occur at the end of the word. Consider once again the forms in (6) and (12). Thus, a rule such as that in (16) might be written.

(16) \[ \text{V} \rightarrow [+\text{Nasal}] \quad \gamma \quad (\gamma) \quad \right] \]

One immediate objection to this might be that, on the surface at least, there can be syllables following the nasalized vowel. The forms in (3) and (7) show that the plural suffix \( \text{pi} \) may follow the nasalized vowel. Little else hinges on the timing of the placement of the plural marker. If we assume that it is added after the nasalization rule applies, the rule in (16) will still suffice.

Another piece of (albeit somewhat ambiguous) evidence here would be the behavior of another stem phonologically identical to the causative. Lak'ota has another form roughly meaning 'to have X for a Y.' Examples are shown in (17).

(17) a. \text{ate} \quad 'father' \\
\text{ateya} \quad 'to have for a father' \\
\text{atewaya} \quad 'I have him for a father' \\
\text{(3rd person sing. objective is unmarked)}
b. $k^h$ola 'friend'
   $k^h$olaya 'to have for a friend'
   $k^h$olawaya 'I have him for a friend'

As the forms in (17) show, this stem behaves similarly to the causative with respect to VOWEL DELETION. Its behavior with respect to nasalization, however, is not completely clear—thus its ambiguity. In data collected during the summer of 1990, nasalization appears to apply to the vowels of these stems. Some examples are shown in (18).

(18) a. $t^h$ukaši 'father-in-law'
      le $t^h$ukaši'uyapi 'We have him for a father-in-law'

b. $t^h$užaya 'to have for a niece'
   $t^h$užawaye 'I have her for a niece'
   $t^h$užayu'uyapi 'We (men) have her for a niece'

Buechel (1970), however, has all of these stems as [-nasal] regardless of the nasality of the preceding vowel. Two of the many possible examples appear in (19).

(19) a. $t^h$ahą 'a man's brother-in-law'
      $t^h$ahaya 'to have for a brother-in-law'

b. $t^h$uwi 'aunt'
   $t^h$uwysiya 'to have for an aunt'

Carter (1974) also maintains that the vowel of this stem does not become nasalized. Some examples of his data are shown in (20).

(20) a. $k^h$u 'mother-in-law'
      $k^h$uyya 'to have one for a mother-in-law'

b. scepa 'a woman's sister-in-law'
   scepaya 'to have for a sister-in-law'
It is difficult to say exactly what is going on here. Dialect variation is a distinct possibility. Another likely story is that this process is changing. It is possible that the behavior of nasality on vowels has changed to a situation that is properly captured by the rule in (16). But if it is, what is it changing from? If this is dialect variation, and the one dialect situation is captured by this rule, how do we explain the other?

Another more serious problem is shown in the forms in (21).

(21) a. ṭə tánə 'to see'
   ṭə blənə 'I see'

b. mnə yə 'to collect'
   mnə wayə 'I collect'

Here we see that nasalization seems to be applying in morphologically underived forms. If we assume that a rule such as that in (16) is applying in these cases, another cherished principle of Lexical Phonology is violated: the Strict Cycle Condition.

(22) STRICT CYCLE CONDITION

a. Cyclic rules apply only to derived representations.

b. Def.: A representation $t$ is derived w.r.t. rule $R$ in cycle $j$ iff $t$ meets the structural analysis of $R$ by virtue of a combination of morphemes introduced in cycle $j$ or the application of a phonological rule in cycle $j$. (Kiparsky (1982:154)

As a structure changing rule, a rule of nasalization would by definition (i.e. by the Identity Constraint and the Elsewhere Condition) be a cyclic rule. And structure/feature changing rules cannot by (22) apply to underived forms. The rule in (16), therefore, should not be allowed to apply in the forms in (21). Feature building rules, on the other hand (as has been shown with respect to e.g. stress) would be permitted to apply in these forms.

More recent work in phonology suggests two important changes need to be made in our conception of underlying phonological representations—changes that may be of
assistance to us here. First, phonological representations may not be linear strings of undifferentiated features. Second, underlying representations need not, indeed should not, be completely specified.

In the SPE model, segments were represented as unordered sets of features, e.g. [+nasal], [-high], [-back], etc. Recent work on just such phenomena as assimilation, however, has suggested that segments are not simply lists of features, but have internal structure, i.e. features are hierarchically arranged. A number of proposals about this structure have been made. Among the more well known are those outlined by Clements (1985) and Sagey (1986). Sagey's is shown in (23).

(23) root
    |- continuant
    |    |- consonantal
    |    |    |- laryngeal
    |    |    |    |- constr.glottis
    |    |    |    |    |- spread glottis
    |    |    |    |    |    |- stiff v.c.
    |    |    |    |    |    |    |- slack v.c.
    |    |    |    |    |- nasal
    |    |    |    |    |    |- labial
    |    |    |    |    |    |    |- round
    |    |    |    |    |    |    |    |- high
    |    |    |    |    |    |    |    |    |- back
    |    |    |    |    |    |- dorsal
    |    |    |    |    |    |    |- place
    |    |    |    |    |    |    |    |- soft palate
    |    |    |    |    |    |    |    |    |- coronal
    |    |    |    |    |    |    |    |    |    |- low
    |    |    |    |    |    |    |    |    |    |    |- anterior
    |    |    |    |    |    |    |    |    |    |    |    |- distributed

A rule of nasalization for Lakhota may be constructed using this framework. Using a structure similar to Sagey's, the following rule is proposed in Patterson (1990:216):
Note that the intervening consonant is specified as the glide y. Thus spreading will be blocked by all other consonants. Also, the vowel undergoing NASAL ASSIMILATION is specified as the low mid vowel a, preventing other vowels from undergoing the nasalization.

The above schema alone, however, will not give us the nasalization on the forms in (7)—triggered apparently by the nasal consonants, not adjacent to the vowels undergoing NASAL ASSIMILATION. Here it appears that a nasal vowel is skipping a vowel and nasalizing the next vowel. Appearances can be deceiving. As Shaw (1980:96) points out, "in the l and d dialects, vocalic nasalization is redundant after nasal consonants." Lakota, then, has the not entirely uncommon feature that vowels are (at least somewhat) nasalized after nasal consonants. These nasal vowels following nasal consonants are not obvious to speakers of, say, English. I assume that the native language of elicitors may be getting in the way here. The nasalization on vowels after consonants, which is expected, is not being heard quite clearly. The nasalization on the following vowel, which is not expected, is heard quite clearly. The nasality of the vowel immediately following the consonant is not therefore marked; the following vowel is marked for the obvious nasalization that is acquired from the preceding vowel. It is this vowel, and not the nasal consonant, that is spreading nasality to the next vowel.

The analysis thus far will not yet account for nasalization on the forms in (12) versus the non-nasalized forms in (19) and (20). No amount of bracket control or level ordering seems to account for this. To
what, then, can we appeal? One other avenue may be open to us.

It has been argued for some time and under many guises that the underlying representation should contain only that information that is nonredundant. That is, the UR should contain only that information that is not predictable. The UR, then, is very likely to be underspecified for all features. For example, in English, the UR of vowels need not and should not contain the information that they are [+voice] as this is predictable information (at least underlyingly) in English.

As mentioned earlier, it has long been recognized that there is an underlying distinction between [-nasal] and [+nasal] vowels in Lakhota. As the preceding discussion shows, it is not possible, given only the framework of Lexical Phonology even with the enhancement of feature geometry, to predict the application of the rule of NASALIZATION. I assume that vowels in Lak'ota are underlyingly prespecified as [+nasal] or [-nasal] or they are unspecified for the feature [nasal]. It is these latter vowels that are susceptible to nasalization.

One area that has been underdeveloped in feature geometry is the possibility that these constructs may allow us to do away (at least underlyingly) with the binary system. Sagey (1986:65-7) argues that there is a difference between class nodes, such as articulator nodes, and standard feature nodes: "While the features on the terminal nodes, such as [anterior], [round], etc., may be specified as either '+' or '-', the class nodes may not." Given a single node dependent on a class node, such as [nasal] on the soft palate node, it is not clear that the +/- specification is necessary. If nasalisation is present, is the feature node is marked [+nasal]. The same result would seem to be the same if we assumed that nasalization was present just in case the feature [nasal] was present on the soft palate node. This may do for most languages. But I argue that it will not for Lak'ota.

As I argued above, Lakhota appears to have an underlying three way distinction between nasal vowels, oral vowels, and unmarked vowels. I therefore argue that the structure of the soft palate node is that shown in (25).
Oral vowels, then will have the feature [raised] on the soft palate node; nasal vowels will have [lowered]. And the vowels in e.g. the causative stem will have neither feature underlyingly. These will acquire the feature [lowered] by lexical rule or the feature [raised] by default rule.

NOTES

1. Since and underlying oral-nasal distinction is not a point of contention (at least among Lakota scholars), it should not be necessary to give examples of these vowel types in situ.

2. Carter's data differed somewhat from that found during research for this effort. His data show that the personal pronoun ni-, second person objective, triggered nasalization, while the personal pronoun ma-, first person objective, did not. My data show that both trigger this rule. It is possible that the rule itself has undergone spreading since Carter did his research in the early 1970's. The analysis presented here is based on my research conducted within the last year.

3. Discussion of this and supporting arguments can be found in Carter (1974) and Patterson (1990).
REFERENCES


