Nasalization in Sharanahua

Eugene E. Loos
SIL-UND

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The nasalization of vowels in Sharanahua[1] can be explained on the basis of consonants present in the underlying form of the morphemes, but the underlying consonants are not always nasal consonants. The explanation proposed here for oral consonants producing nasal vowels exploits the notion of sequential constraint rules ordered among or after other phonological rules.

A syllable-final nasal consonant in Sharanahua causes the vowel of the closed syllable to be nasalized. The nasal consonant is then deleted by a rule which deletes all syllable-final stops. Then non-consonantal segments adjacent to the nasalized vowel are also nasalized:

(1) 'Go away.' /ka-tan-wɨ/ go-away-impv
                 katãnwɨ
                 katãwɨ
                 [katãw̃ɨ̃]   surface form

Morphemes and stems that have three syllables lose the vowel of a final open syllable. Compare the subject and object forms of 'duck':

		subject indicator	objective case
(2)	'duck' (a)	/nonoma-n/	(b) /nonoma/
		---	nonom
		nonomãn	nonõm
		[nonomã]	[nonõ]

Trisyllabic nouns with oral consonants beginning the third syllable, and bisyllabic verb stems which become trisyllabic by prefixation undergo the same shortening via vowel deletion and deletion of syllable-final stops, but the vowel of the syllable which at one stage is closed is still nasalized:

		subject indicator	objective case
(3)	'alligator' (a)	/kapɨta-n/	(b) /kapɨta/
		---	kapɨt
		kapɨtãn	kapɨ̃t
		[kapɨtã]	[kapɨ̃]

	Imperative			Imperative
(4)	(a) 'Lower it.' /pakɨ-wɨ/	(b)	'Lower the	/ma-pakɨ-wɨ/
	---		top of it!	mᵇapakwɨ
	---			mᵇapãkwɨ
	---			mᵇapãwɨ
	surface forms [pakɨwɨ]			[mᵇapãw̃ɨ]

Continuants do not produce nasalization and do not delete:

(5)   'fingernail'   /miȼisi/
                miȼis
               [miȼis]

One possible explanation would be that simplification has occurred. A rule (6a) which nasalized vowels in nasal-closed syllables formerly referred to both nasality or voicing and continuancy in its environment and by simplification (6b) dropped the feature specifying nasality or voicing:

(6)   (a) $V \longrightarrow [+nas] \ / \_\_\_ \begin{bmatrix} +obs \\ -cnt \\ +nas \end{bmatrix} \begin{Bmatrix} C \\ \# \end{Bmatrix}$

(b) $V \longrightarrow [+nas] \ / \_\_\_ \begin{bmatrix} +obs \\ -cnt \end{bmatrix} \begin{Bmatrix} C \\ \# \end{Bmatrix}$

Rule (6b) would nasalize the vowel of any syllable closed by a stop. However, it is difficult to see why a feature [+nas], which is the obvious conditioning factor, would be lost. Such an argument based on simplicity alone would be making a claim that simplification leads to unexpected and undesirable generalizations, since we would expect assimilation to be caused not by an oral consonant but by a nasal.

If the lost feature were [+vd] instead of [+nas] the same objection would be raised: rule (6a) would constitute the claim that the nasalization of the vowel is unrelated to the feature of nasality in the following consonant even though that consonant is the conditioning factor in the nasalization.

A hypothesis that seems to me to be more plausible incorporates the notion of sequential constraint rules ordered where necessary before or after some of the phonological rules, but otherwise ordered late, near the output of the phonological component.

Sharanahua morphemes allow only strident continuants and nasal stops as the first members of two-consonant clusters. It might be argued that nasals are continuants in the underlying form, and that later rules change them to non-continuants. This would allow us to claim that only continuants are found as the first members of consonant clusters, but would require a later rule to mark the voiced

consonants as stops.

(7) kɨska-   'like'
    awɨska   'how'
    paṣna   'dog'
    ainpo [ãĩpo] 'wife'

However, as in the case of [ãĩpo] above, in all Panoan languages where syllable-final deletion of p, t, and k occurs, all syllable-final nasals are also deleted with nasalization remaining as a trace of the nasal consonant. The level of abstraction necessary to make the claim about nasals being continuants in the underlying forms has no surface evidence to support it.

The constraints on Sharanahua consonant clusters (in the underlying forms) can be stated as a prediction that if the first member is a continuant it will be strident, and if it is non-continuant it will be nasal.

This sequential constraint rule (morpheme structure rule) would, if applied after some of the ordered phonological rules, still account for the consonant cluster possibiltites found in morphemes, and if applied to a consonant cluster produced by the elision of third vowels as shown earlier, would also account for Sharanahua nasalization when the underlying form has no nasal consonant, for the rule would change the features of the syllable-final oral stop converting it to a nasal stop. The sequential constraint rule then not only predicts redundancies but makes sequences conform to specific feature content.

With this hypothesis of sequential constraint rule application, the difference between Sharanahua and other Panoan nasalization would only be in the point at which the sequential constraint rule operates. However, it would be difficult to see why a morpheme structure rule should drop from the set of Morpheme Structure Rules ordered prior to all other phonological rules. If, on the other hand, MS-rules were not necessarily ordered before all other phonological rules but preceded them or were interspersed where relevant and otherwise ordered after them, they would still accomplish their purpose.

If with regard to the stated domain of a rule it can be assumed that a generalizing process takes place in which rules move 'up' in rank from morpheme-level to word-level, (rather than vice-versa), it could be expected that a morpheme-level rule ordered late in the series of phonological rules would move up the series as it changed from morpheme-level to word-level. But it would not be a move up 'rule by rule' until it came to rest where we now find it. It would be a move to that point in the rules where it could find conditions in the derivations that met the specifications of its environment.

The notion of MS-rules ordered among the phonological rules is not new. Harms (1968.90)[2] cites a case for Russian where a P-rule would have the same form and accomplish the same thing as its MS counterpart. Consequently, insistence on keeping all MS-rules in a separate component would constitute the claim that the P-rule was in some sense different from the MS-rule.

In the case of Sharanahua, the facts warrant the conclusion that sequential constraint rules do more than serve as a matching operation to determine whether a sequence fits the pattern of the language. It changes the features of a sequence to make them conform to those patterns, and when ordered among the P-rules it serves both as a P-rule and an MS-rule and can bring about a restructuring of morphemes. A Sharanahua child who hears only the nasalized apocopated form of a morpheme cannot tell that it has an oral consonant in its underlying form until he hears its longer form. Consequently some speakers occasionally reconstruct the long form with new underlying consonants:

(8)	Short form:	Original form:	Reconstructed form:
'duck'	nonõ	nonoma	nonopa
'alligator'	kapɨ̃	kapɨta	kapɨma

Footnotes

1. Sharanahua data are provided by Marie Scott. See Loos, Eugene "La señal de transitividad del sustantivo en los idiomas panos" in Loos, Estudios Panos, Instituto Linguistico de Verano, Peru. 1973

2. Harms, Robert T. Introduction to Phonological Theory. Prentice-Hall, Englewood Cliffs, New Jersey.