

Navaho verbal suffixes : the phonology thereof

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0. Introduction

This paper determines and formalises some of the changes wrought on Navaho verb-roots by the addition of certain verbal suffixes.

1. Low-tone suffixes

The addition of a low-tone suffix, e.g. -da¹ (the second element of the two-place negative morpheme doo ... -da) produces a change in those verb-roots having high-tone vowels.

- (1) diiyá # da → diiyáa # da
 yiyiiltsá # da → yiyiiltsáa # da
 yiyiiltsóód # da → yiyiiltsóo # da
 yiists'áá' # da > yiists'áa' # da

A high-tone vowel becomes a falling tone. This might be captured by a rule such as (2).

- (2) V → [+ falling] / — (C) # C V
 [+ tone] + long [- tone]

Such a rule, however, makes a number of assumptions that we might wish to question. It assumes that the features [long] and [falling] are used to distinguish Navaho vowels; it assumes that the change we have observed is a unitary process.

Both assumptions can be questioned. Concerning the use of the features [falling] and [long], let us note the distribution of falling and rising tones in Navaho. Such tones never occur on short vowels, but only on long vowels and diphthongs. Now the use of the feature [falling] on diphthongs is prohibited by the fact that a diphthong, by its nature, must be represented as a sequence of two vowels, and there is to my knowledge no way of knowing to which of the two vowels one is to attribute the feature [falling]. Instead one must represent a falling tone

(7) Table of occurring (*) and non-occurring (-) roots

Vowel of root	V-final root	n-final root	C-final root
V	*	*	*
y	-	-	*
VV	*	*	*
yy	-	-	*
ǃ	*	-	-
ǃ̃	*	-	-
ǃǃ	-	*	*
ǃǃ̃	-	-	*

One notes first of all that n-final roots do not pattern in the same way as roots ending in other consonants. One notes also certain parallelisms between the distribution of n-final roots and nasal-vowel final roots. Notably we find that there exist roots in Vn but not y; in VVn but not yy; in ǃ̃ but not ǃn. (The lack of forms in ǃǃ̃ may be due to the presence of forms in ǃǃ̃n or to a more general constraint that there are no long high-tone vowel final roots.) One further notes the complete absence of nasalised vowels followed by nasals.

There appears to be some process of nasalisation, where a short high-tone vowel plus a root-final nasal become a short high-tone nasal vowel.

Having now good reason to suppose that there are some nasalised vowels that have their origin in a sequence of oral vowel plus nasal, we might look to see if it is not possible to derive all nasal vowels from a similar source. Thus we might consider that roots containing a nasal vowel and a final consonant have undergone a process whereby an underlying nasal consonant created the nasalised vowel in the context of the following stop.

The rules could be formalised in the following way. First, consider the derivation of root-final nasal vowels.

This rule must be restricted to short high-toned vowels.

$$(8) \quad \begin{array}{c} V \\ [+ \text{ tone}] \end{array} \longrightarrow [+ \text{ nasal}] \quad / \quad C \quad ____ \quad n \quad \#$$

The rule concerning nasalisation before a consonant, however, has no restrictions as to tone or length.

$$(9) \quad V \longrightarrow [+ \text{ nasal}] \quad / \quad ____ \quad n \quad C^2$$

One might expect that (8) and (9) can be collapsed into a single general rule of nasalisation, but this is impossible given the restrictions as to length and tone on rule (8). One could of course write such a rule into the grammar and follow it with a rule undoing its effect where necessary but this seems a somewhat tortuous device that saves nothing in terms of the number of rules.

Given these rules, how does one now derive yiyiiltsáani' ? It would appear that the environment for nasalisation has somehow been destroyed. The underlying representation is now

$$(10) \quad \text{yiyiiltsán} \# \text{ni}'$$

We must remove the final n of the verb. This may be accomplished by a very general rule of Navaho that deletes one of two adjacent identical consonants.³

One may have observed this rule at work in (1) where:-

$$(11) \quad \text{yiyiiltsóód} \# \text{da} \longrightarrow \text{yiyiiltsóo} \# \text{da}$$

$$\begin{array}{lcl} \text{also} & \text{dee} + \text{sh} + \text{shish} & \longrightarrow \text{dee} + \text{shish} \\ & \text{FUT} \quad \text{1st} \quad \text{ROOT} & \\ & \text{Person} & \end{array}$$

This rule may be formulated:-

$$(12) \quad C_i \longrightarrow \emptyset \quad / \quad ____ \quad (\#) \quad C_i$$

The derivation of (6) is now:-

$$(13) \quad \begin{array}{ll} & \text{yiyiiltsán} \# \text{ni}' \\ \text{Rule (12)} & \text{yiyiiltsá} \# \text{ni}' \\ \text{Rule (8)} & \text{"} \\ \text{Rule (3)} & \text{yiyiiltsáá} \# \text{ni}' \\ \text{Rule (4)} & \text{yiyiiltsáa} \# \text{ni}' \end{array}$$

The rules of nasalisation are not yet complete. There needs a rule to delete the nasal consonant after the preceding vowel has been nasalised.

$$(14) \quad n \longrightarrow \emptyset \quad / \quad \begin{matrix} V \\ [+ \text{ nasal}] \end{matrix} \text{ —}$$

Also, since we are considering long vowels to be sequences of two vowels, there must be a rule that will spread the nasality to adjacent vowels. So far we have only seen cases where the nasality spreads from the last vowel forward, but later examples will demonstrate that the process works in both directions, thus constituting a mirror-image rule.

$$(15) \quad V \longrightarrow [+ \text{ nasal}] \quad / \quad \begin{matrix} V \\ [+ \text{ nasal}] \end{matrix}$$

The particle -go (marking adverbial clauses) is peculiar in that it consistently allows of two forms, one of which arises from a rule that optionally deletes the g of the suffix. ⁴

$$(16) \quad \begin{array}{lcl} k'e'esh'ad \# go & \longrightarrow & k'e'esh'ad \# go \\ & & \text{or } k'e'esh'ad \# o \\ 'adiníldíin \# go & \longrightarrow & 'adiníldíin \# go \\ & & \text{or } 'adiníldíin \# o \end{array}$$

As might be expected the situation becomes more complex with vowel-final roots, since this now puts two vowels in juxtaposition. The relevant data for verbs ending in -a and -i is summarised below.

(17) Vowel of stem	V	ŷ	ý
a	a # o	á # o	ǎ # ǫ
i	o # o	ó # o	ǫ # ǫ

The forms with the short low oral vowels in the root require no comment. The forms with high short vowels do not show the lengthening and falling predicted by rules (3) and (4). Therefore, one must assume that the g- of the suffix has dropped before the application of these rules and that the application of these rules is blocked by the lack of an initial consonant in the suffix.

The forms with a nasalised vowel in the root show that nasalisation and the deletion of the final -n have taken

First, and most simply, one could consider that there exists some rule that optionally shortens the vowel in certain verbs.

Second, one might look at the apparent non-existence of consonant-final verb roots with short high-tone vowels. This gap appears somewhat unusual and we might wish to explain it by saying that there do in fact exist such roots (tsod and 'š' being two examples) but that these roots almost everywhere undergo a rule that lengthens the vowel, thus rendering them indistinguishable from roots with long high-tone vowels. The only circumstances in which the nature of the short vowel appears is in the optional form before góó. If a general rule of lengthening exists then it must occur early in the phonology and must carry the condition that the rule is optional in the environment of a following góó.

There exist two high-tone suffixes that begin with vowels, namely ǵǵ (relativising particle) and ǵǵíí (nominalising particle). These suffixes provoke changes in a number of different types of verb roots.

High-tone consonant-final verb roots customarily have only long vowels (although we have seen above some evidence for supposing an underlying distinction between long and short vowels). When preceding these suffixes, however, we find only short vowels, thus indicating some process of shortening. This shortening goes across the board so we cannot attribute it to the same source that produced the sporadic and optional shortening before góó. Thus we can propose rule (20).

$$(20) \quad \begin{array}{c} V \\ [+ \text{ tone}] \end{array} \longrightarrow \emptyset / \begin{array}{c} V \\ [+ \text{ tone}] \end{array} \text{ --- } C \# \begin{array}{c} V \\ [+ \text{ tone}] \end{array}$$

When we look at verb roots that on the surface end in nasalised vowels, we find that if these roots are followed by these suffixes, then the underlying n surfaces and the nasalisation of the vowel disappears.

$$(21) \quad \text{yiyiiltsán} \# \acute{V} \longrightarrow \text{yiyiiltsán} \# \acute{V}$$

It would appear that, according to rule (8), the á is in a suitable environment for nasalisation. So obviously we need some way of blocking the application of rule (8).

We need to restrict (8) such that it will not apply in the event of there being a following vowel. This can be achieved by adding to the environment of the rule either a following consonant or a pause boundary, or alternatively by adding a negative environment that the following segment be not a vowel.

In the event that the root ends in an oral high-tone vowel, we find that an h is epenthesised. This rule will obviously be conditioned by the vowel of the root coming into contact with a vowel of the suffix. (There is, however, no h-epenthesis in the forms of go where the g- is lost. Therefore h-epenthesis must precede g-deletion.)

$$(22) \quad \emptyset \rightarrow h \quad / \quad \begin{array}{c} V \\ [+ \text{ tone}] \end{array} \# \quad \text{---} \quad V$$

Alternatively, one can look upon the h's as being part of the underlying representations of all high-tone oral roots that are vowel-final on the surface, with a rule to delete the h in all circumstances except this one. This would mean that there would be no underlying vowel-final high-tone roots, since all such vowels would be derived from underlying sequences of vowel plus n or vowel plus h. It would also explain the apparent non-existence of consonant-final short high-tone roots, since such roots would occur underlyingly. But there would still remain the problem as to why consonants other than h or n could not appear in such roots.

The situation becomes decidedly more confused when one looks at low-tone vowel-final roots. These forms are, for some reason, sometimes hard to elicit. A number of different processes seem to be in conflict. Sometimes an h is epenthesised, sometimes a y. A final -a will sometimes merge with a following ga to yield ga. More curiously, the hitherto free variation between igii and i now appears to trigger different processes. It is not easy to motivate any analysis in the midst of this confusion and I will leave the matter in obscurity.

3. Sequences of suffixes

Given their syntactic nature, it is generally not possible to add more than one suffix to a verb root. It is possible in some circumstances, however, most notably with the negative particle da, which always precedes other suffixes. These concatenations always take predictable forms, with one notable exception.

When the morphemes da and go are both suffixed to a root, then we find a surprising number of optional rules applying to yield an equally surprising number of alternate forms.

One obvious source of alternate forms is the optional deletion of g, as has been noted above. However, with high-

tone vowel-final roots, it is possible to delete the da morpheme altogether, marking this deletion by a high tone on the go. Now it becomes possible to delete the g optionally. Furthermore, if the vowel of the verb root is i, then it may change to o, presumably by the rule discussed in Section 1, although it would appear that here the rule applies optionally. These changes are summarised and exemplified below.

(23) Schematisation of possible contractions

After application of normal rules	ŲV # da # go	ŲY # da # go
Possible further contractions	ŲV # da # o	ŲY # da # o
	ŲŲ # # gó	ŲŲ # # gó
	Ų # # ó	Ų # # ó

(24) Examples of possible alternate surface forms

yiyiiltsán # da # go	yiyiiltsáadago
	yiyiiltsáadao
	yiyiiltsáágó
	yiyiiltsáó
'ak'e'shéłchín # da # go	'ak'e'shéłchíidago
	'ak'e'shéłchíidao
	'ak'e'shéłchíígó
	'ak'e'shéłchííó
	'ak'e'shéłchíóó

Obviously it is not easy to sort out the exact nature, or even the exact number, of processes that are going on here. Let it merely be mentioned that whatever the process is that renders the final ó high-toned, it would seem to be operating so that the final output of these rules does not become homophonous with the output from the underlying forms that have no da.

4. Conclusion

This paper has explored the phonology on the other side of the Navaho verb, so to speak, other studies having concentrated on verbal prefixes, where matters are exceedingly complex. I hope this paper has shown that there is at least one area of Navaho phonology where visibly systematic and homogeneous processes are to be found. In fact, this paper probably suggests more systematicity than actually exists. I have not discussed the problems arising with diphthongal roots, the suffix dáá, and the various exceptional verbs that seem to pattern sometimes this way and sometimes that. These matters must await the explication of later scholars.

FOOTNOTES

1. Throughout I will use conventional Navaho orthography, as set forth in Young and Morgan (1943 : pp.I-VI). Briefly, í represents a high-tone vowel; y a nasal vowel; and VV a long vowel.
2. The exact nature of the underlying nasal consonant remains of course indeterminable in this instance.
3. This rule must operate before certain low-level rules, since it is possible to get sequences of two n's by the dropping of unstressed short vowels in fast speech.
4. There is one similar case in Navaho, where the morpheme ígíí has an alternate form í which may be the result of a related process. The rule is not, however, a general one.

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