How Shall We Write What Was Left When the Labialized Post Velar Lost Its Velar?

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0. Introduction

The Angan languages of Papua New Guinea are especially characterized by complex morphophonemics that frequently admit multiple solutions as equally valid ways of describing/ accounting for surface variation. It is the purpose of this paper to show how a third semivowel had been accounted for and excluded from the practical orthography of Angave[1], which is one of the Angan languages.

1. [ɰ̟] as a Separate Phoneme

In our initial phonetic transcriptions of Angave we found that the back semivowel did not always condition rounding on the preceding vowel. As we sorted the data and mimicked the native speakers we concluded that they actually distinguished between a high back semivowel that we transcribed as [w] which conditioned rounding, and a non-high back semivowel that we began transcribing as [ɰ̟] which did not. As we looked for conditioning factors we realized that the distribution of [ɰ̟] was very restricted, occurring in only two sets of words, the present imperative singular of some verbs ending with sequence [#...ɑɰ̟ə#] and nominals ending with the sequence [#...ɑʔɰ̟əʔ#].

[1] The Angave language has an estimated 1000 speakers living at the headwaters of the Swanson and Mbwei Rivers in Papua New Guinea. The language area lies at the northwest extremity of the Kaintiba Sub-District in the Gulf Province. Angave is one of twelve languages comprising the Angan language family (formerly labeled Kukukuku), a stock level isolate.

So we tried positing /ɑ/ as the underlying vowel preceding [ʷ] and /ɑu/ preceding [w].

We immediately realized that this solution failed to account for other related data. We noted that [u] only occurred following [w], as in (1), never following [ʷ], as in (2).

1) a.	['ɑᵘʔwuʔ]	/ɑwɬ/[2]	'fat'
b.	['wɑᵘʔwuʔ]	/wáwɬ/	'hornet'
c.	[ɪ'tɑᵘʔwuʔ]	/ɪráwɬ/	'toilet'
d.	['šuʔwuʔ]	/sɬwɬ/	'bite'
e.	[ŋ'guʔwuʔ]	/gɬwɬ/	'flesh'
f.	['tuʔwuʔ]	/rɬwɬ/	'back'

2) a.	['ɑʔʷəʔ]	/áɬ/	'taro'
b.	['wɑʔʷəʔ]	/wáɬ/	'yard'
c.	['tɑʔʷəʔ]	/ráɬ/	'garbage'
d.	['pʸɑʔʷəʔ]	/pɪáɬ/	'gonads'
e.	['šɪg'gɑʔʷəʔ]	/sɬkɬkáɬ/	'eyebrow'
f.	['ɑ'yɑʔʷəʔ]	/ɑyáɬ/	'twins'

Since [w] never occurred with [ə] following and [ʷ] never occurred with [u] following it appeared that the two following vowels were round and unround surface variants of the same underlying central vowel. So here was evidence suggesting that [w] conditioned rounding in its environment for it affected the following vowel, progressively rounding it, whereas [ʷ] did not. And, if [w] conditioned progressive rounding in following vowels wouldn't it likely account for the rounding seen on all the vowels preceding it in (1).

Morphological changes that we noted in verb paradigms

[2] Transcriptions in slashes are generally phonemic. Glottal stop has been treated as a feature of syllables and written over vowels as an acute accent phonemically and in the practical orthography.

affirmed that hunch. For example, compare the two truncated paradigms in (3-4).

3)	a.	[nə'mɪřə]	/nɬmɪrɬ/	'digging'
	b.	['mɪʔyɪnə]	/mɬnɬ/	'I dig'
	c.	['mɪʔwunə]	/mɬwɬnɬ/	'we (pl) dug'
	d.	['mɪʔwɪyɪ]	/mɬwɪɬ/	'we (dl) dug'
	e.	['mɪʔyɪyɪ]	/mɬɪɬ/	'they (dl) dug'
4)	a.	['nətəřə]	/nɬtɬrɬ/	'putting'
	b.	['təʔənə]	/tɬɬnɬ/	'I put'
	c.	['tuʔwunə]	/tɬwɬnɬ/	'we (pl) put'
	d.	['tuʔwɪyɪ]	/tɬwɪɬ/	'we (dl) put'
	e.	['tɪʔɪyɪ]	/tɬɪɬ/	'they (dl) put'

It is the /w/ ('1st person nonsingular') that regressively conditions the rounding of the stem vowel in the verb 'put' so that the underlying central vowel is realized as a high back rounded vowel. Therefore [ɯ] conditioning regressive rounding on vowels as seen in verb paradigms is a phonological process we then expected to find operating elsewhere.

Furthermore, we realized that whereas half of the present imperative singular verb forms containing [ɯ] had come from verb stems that appeared to have stem vowels that are nonround, as in (5), half did not, as in (6).

		infinitive		imperative sg.		
5)	a.	[nə'mæřə]	/nɬmɛɑrɬ/	['mɑɯə]	/mɛɑɬ/	'get'
	b.	[nən'ʝæřə]	/nɬʝɛɑrɬ/	[n'ʝoɯə]	/ʝɛɑɬ/	'break'
6)	a.	[nə'řɔřə]	/nɬroɑrɬ/	['toɯə]	/roɑɬ/	'take out'
	b.	[nə'tɔřə]	/nɬtoɑrɬ/	['toɯə]	/toɑɬ/	'smoke'

Since we could not find any phonological processes from verb paradigms that suggested that preceding vowels conditioned

[w] and [ɯ] in (5-6), since there was clear evidence that [w] caused regressive rounding in the stem vowel of /ɬ/ stem verbs in (4), and since [w] appeared to condition progressive rounding as well in (1), we concluded that the data were showing us that there were two different underlying back semivowels, one that conditioned rounding and one that did not. So initially we included [ɯ] in the inventory of phonemes, writing it as /wh/ in the practical orthography.

2. [ɯ] as an Allophone

The conclusion that [ɯ] was an independent phoneme was, however, very uncomfortable for two reasons. First, phonological systems with three semivowels are hardly common. Second, the extremely limited distribution of [ɯ], being found in only two sets of words in very similar environments, was disconcerting. At the same time, however, we could not ignore [ɯ] because it contrasted with [w] in minimal pairs (cf. 1a vs. 2a; 1b vs. 2b). In addition, in the Kapau language bordering Angave to the east, a voiceless [ʍ] is included in the inventory of phonemes and compared to the 'wh' in the word 'whale' 'of some English speakers' (Oates & Oates 1968:7). The same is also true for Menya and Wojokeso, two other Angan languages (Healey 1981).

Further on in our analysis of the Angave sound system and its phonological processes we realized that there was very good motivation for deleting /wh/ from the orthography and the phoneme inventory altogether and thus we have done so. These are the data that motivated that decision. Not all C^{w} condition regressive rounding on preceding central vowels. Consider (7-8).

7) a.	['kʸɑᵘŋʷu?]	/kɪɑŋwɬ/	'greens'
b.	['ɑᵘŋgʷu?]	/ɑgwɬ/	'sky'
c.	['wɑᵘgʷu?]	/wɑkwɬ/	'cough'
d.	['tɑɣʷɑ?]	/rɑxwɑ/	prawn sp.

e. ['yɑɣʷə?] /yɑxwɬ/ 'turn'

8) a. ['wɑŋə?] /wɑŋɬ/ 'aibika'
b. ['tɑŋgə?] /rɑgɬ/ 'blood'
c. ['ɑřəgə?] /arɬkɬ/ 'earthworm'
d. [tʌ'ɣɑ?] /rɬxó/ 'trip stick'
e. ['šɑɣʌ?] /sɑxɬ/ 'salt'

A comparison of (7a-c) with (8a-c) shows it is the labialization on Cʷ which conditions regressive rounding on the preceding central vowel. As (7d-e) show, however, regressive rounding does not occur when the C is post velar. Thus the contrast between [ʷ] and [ᶣ] is paralleled by [Cʷ] and what we could have transcribed as [Cᶣ]. We didn't transcribe it that way because we could not hear a difference in the labialization itself, only in the different affect that it has on the surrounding central vowels. But this labialization on consonants that doesn't condition rounding in its environment (or [Cᶣ]) only occurs when the C is postvelar.

This suggested that perhaps historically the instances of [ᶣ] in (2) came from *kᵛʷ, leaving a semivowel that didn't cause regressive rounding and contrasted with [ʷ]. In the most peripheral dialect of Angave, Winoyit, we found data that supported such an hypothesis. Compare the reflexes of the final two syllables of some Angave nominals listed in (9) for the Angai[3] and Winoyit dialects in the light of a historical reconstruction.

	Proto-Angave	Winoyit	Angai
9) a.	*#...V?kᵛʰʌ?#	[#...ɑkᵛʰʌ?#]	[#...ɑ?ɑ?#]
b.	*#...V?kᵛʷə?#	[#...ɑkᵛʷə?#]	[#...ɑ?ᶣə?#]
c.	*#...V?kə?#	[#...əkə?#] (rare)	[#...ɑ?ɑ?#]
d.	*#...V?kᵛʷu?#	[#...ɑᵘkᵛʷu?#]	[#...ɑᵘ?wu?#]

[3] All other examples in this paper are from the Angai dialect.

Winoyit speakers have lost glottal stop before velars and postvelars. Angai speakers have lost the velar and postvelar stops, but retained labialization and glottal stop. In (9b) the Angai reflex of labialization is the non-high round semivowel [ɯ̯]. But in (9d) it is the high round semivowel [w]. Whereas the contrast between (9b) and (9d) in Winoyit is maintained by [k̟ʷ] vs. [kʷ], between (9b) and (9d) in Angai it is maintained by [ɯ̯] vs. [w]. Note further that [ɯ̯] does not condition rounding in the following central vowel, or the insertion of a high round glide before glottal stop, as [w] does. /k̟ʷ/ is a combination of competing environments. It appears that the postvelar segment cancels the following labialization's ability to effect rounding in its environment whether progressive or regressive.

When *k̟ʷ → [w] in Angai, the phonetic manifestation of the preceding vowel was not an [ɑᵘ] and so the labialization was reinterpreted as a non-high round semivowel, and a new and potentially contrastive segment entered the language. It has not yet entered the underlying inventory of segments, however, because its occurrence is predictable from the unique word final vowel sequence in which it occurs (in nominals). Therefore, we formulated an insertion rule for [ɯ̯] that does justice to its very limited distribution.

[ɯ̯] Epenthesis ([ɯ̯] Epen)

$$\emptyset \rightarrow \begin{bmatrix} C \\ -\text{consonantal} \\ +\text{sonorant} \\ -\text{high} \end{bmatrix} / \begin{bmatrix} V \\ +\text{low} \\ +\text{back} \\ -\text{round} \end{bmatrix} \, ? \, \_\_\_ \, \begin{bmatrix} V \\ -\text{low} \\ +\text{back} \\ -\text{round} \end{bmatrix} \, ?\#]_{\text{nom}}$$

[ɯ̯] Epen states that the sequence /ɑɑ?#/ in nominals is broken up by inserting [ɯ̯] between the vowels.

This process is certainly related to another epenthesis

rule we had previously formulated and called Semivowel Epenthesis (Semi Epen).

Semivowel Epenthesis (Semi Epen)

$$\emptyset \rightarrow \begin{bmatrix} C \\ -\text{consonantal} \\ +\text{sonorant} \\ \alpha\text{round} \end{bmatrix} / \begin{bmatrix} V \\ \alpha\text{round} \\ \alpha\text{back} \end{bmatrix} (?) \_\_\_ V]_{vb}$$

(If first V is [+low], ʔ is obligatory.)

Semi Epen states that the semivowels [y] and [w] are inserted in vowel sequences in verbs when the values for round and back in the first vowel of the sequence match. Now if we ignore for a moment the structural restrictions following V?__V in [ɰ] Epen we see that it inserts a semivowel in the environment where Semi Epen is blocked from operating, that is, when the first vowel in a sequence is [+back] but not [-round].

3. The Changing Status of [ɰ]

We might speculate that [ɰ] Epen may eventually be conflated with Semi Epen, and thus [ɰ] could begin appearing in verbals in the environments where [y] and [w] are blocked from occurring. Such an incipient association may be argued for on the basis of the imperative forms in (5-6), which is the only other environment where we initially recognized [ɰ] to occur. Consider the derivations of ['moɰə] 'get (it)!' and [ɾɑɰə] 'take (it) out!' in (10) which cannot undergo [ɰ] Epen because they do not meet its structural description, i.e. no glottal stop interrupts the sequence of vowels. If [ɰ] Epen could be revised to apply to the forms in (10), then the surface form of these present imperatives could also be accounted for.

10. UF	/mɐɑɨ	rɔɑɨ/
Monoph[4]	mæ ɨ	rɔ ɨ
Vowel Red[5]	mɑ ɨ	rɑ ɨ
[ɯ] Epen'	mɑɯɨ	rɔɯɨ
SF	['mɑɯə	'ɾɔɯə]

Semi Epen cannot apply to the output of Monoph in (10) because the first vowel is low and not terminated by glottal closure. Both strings meet the structural description of another rule, Vowel Red (subsequent to stress assignment), and [ɑ] results. The sequence /ɑɨ/ potentially meets a more generalized version of [ɯ] Epen (minus the glottal stop between the vowels) which we shall call [ɯ] Epen'. [ɯ] is therefore inserted, and the derivations in (10) are accounted for on the basis of phonological processes. The revised [ɯ] Epen' is formulated as follows.

[ɯ] Epenthesis' ([ɯ] Epen')

$$\emptyset \rightarrow \begin{bmatrix} C \\ -\text{consonantal} \\ +\text{sonorant} \\ -\text{high} \end{bmatrix} / \begin{bmatrix} V \\ +\text{low} \\ +\text{back} \\ -\text{round} \end{bmatrix} (?) \_\_\_ \begin{bmatrix} V \\ -\text{low} \\ +\text{back} \\ -\text{round} \end{bmatrix} (?)\#]_{\text{nom, imp}}$$

The derivations of ['yowu] 'sprinkle', ['mɐyɪ] 'care for', ['yɔɯə] 'pull out', and ['yɑɯə] 'cook' in (11) illustrate how both epenthesis rules operate:

[4] This rule accounts for the lowering of mid vowels, maintaining the same values for [±back] and [±round], when they are followed by an /ɑ/ that is elided.

[5] This rule accounts for nonhigh vowels that reduce to central vowels of the same height.

11.	UF	/yoɨ	meɨ	yoɑɨ	yeɑɨ/
	Monoph	---	---	yɔ ɨ	yæ ɨ
	Vowel Red	---	---	yɑ ɨ	yɑ ɨ
	Semi Epen	yowɨ	meyɨ	---	---
	[w̱] Epen'	---	---	yɑw̱ɨ	yɑw̱ɨ
	SF	['yowu	'meyɩ	'yɑw̱ə	'yɑw̱ə]

Some time subsequent to drawing these conclusions we realized the [w̱] also occurs in two other places where we had originally transcribed it as [o]. Consider (12-13).

12) a. [meƀə'šɪʔɪyɩ] /mepɨsfɪɨ/ 'they (dl) will care for'
    b. [mɪƀə'šɪʔɪyɩ] /mɪpɨsfɪɨ/ 'they (dl) will harvest'
    c. [mɑƀə'šɪʔɪyɩ] /meɑpɨsfɪɨ/ 'they (dl) will get'
    d. [məƀə'šɪ?ɪyɩ] /mopɨsfɪɨ/ 'they (dl) will throw'

13) a. [meƀə'tɑʔoə] /mepfrfɑɨ/ 'they will care for'
    b. [mɪƀə'tɑʔoə] /mɪpfrfɑɨ/ 'they will harvest'
    c. [mɑƀə'tɑʔoə] /meɑpfrfɑɨ/ 'they will get'
    d. [məƀə'tɑʔoə] /mopfrfɑɨ/ 'they will throw'

The forms in (12-13) are all immediate future third person final verbs, but those in (12) are dual while those in (13) are plural. We recognized that the semivowel in the final syllable of the dual forms could be accounted for by Semi Epen, the final /ɨ/ having been fronted and raised to [ɩ] by the inserted [y]. Only much later did we realize that the same processes account for the plural forms also if what we transcribed as [o] was the same as the [w̱] we had recorded elsewhere.[6] In fact one new Angave literate recognized it to be the same because he wrote the forms in (2) not with /wh/ but rather with /o/, the same symbolization we began with for the endings in (13). Thus [w̱] Epen' also accounts for (13).

[6] ED: The author reports he cannot hear a difference between [w̱] and [o].

The other place where we originally transcribed [ʍ] as [o] is illustrated by (14-15):

14) a.	[šuʔ'ʍiyɪ]	/sɬʍɬ/	'"dog"'
b.	[ʍɑ'teyɪ]	/ʍáréɬ/	'"scorpion"'
c.	[ɪ'ɓiyɪ]	/ɪpɬ/	'"sinkhole"'
d.	[ɑ'ʍeyɪ]	/ɑʍéɬ/	'"sorry"'
15) a.	['tɑʔɑoə ~ 'tɑʔoə]	/rɬáɬ/	'"fire"'
b.	[e'mɑoə]	/emáɬ/	'"moon"'
c.	['šɑʔɑoə ~ 'šɑʔoə]	/sɬáɬ/	'"dark"'
d.	[ʍɑ'ɾɑoə]	/ʍaráɬ/	'"skin"'

The final [yɪ] affixed to each word in (14) and [oə] to each word in (15) are like quotation marks and occur in utterances such as 'We call it "fire".' The same pattern observed in (12-13) is again evidenced here and so we have adopted the same solution. When we first recognized that the [o] was probably an alternate transcription for the same surface form, [ʍ], we were a bit puzzled as to why we should have transcribed them differently, but upon further reflection we think that it actually substantiates our early hypothesis that Angave has two back semivowels, the high back one conditioning rounding and a non-high back one not conditioning rounding, and those correspond nicely to [u] and [o] respectively.

In conclusion, it appears to us that in view of Angave's propensity for inserting semivowels, and in view of the fact that the other two semivowels are no longer predictable in nominals, [ʍ] has the potential for becoming a full fledged member in the phoneme inventory. This may already be the case for we know of one compound nominal containing [ʍ], [ɑʔ'ʍɑɸʌʔ ~ ɑ'ḳʷɑɸʌʔ] 'wringing out', that does not meet the structural description of [ʍ] Epen'. Perhaps /wh/ will enter the phoneme inventory in just a very few years.

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