

Phonology problem set

24.900 — Introduction to linguistics

April 20, 2005

1 Apinayé consonant allophony

The following (slightly simplified) data are from the Apinayé language, spoken in central Brazil. The data are given in broad phonetic transcription, using the IPA. A vowel with a tilde (i.e., ã, ê) stands for a nasalized vowel, that is, one that is produced with airflow through the nasal cavity. [tʃ] and [dʒ] count as single (affricated) segments. Answer the questions that follow, in essay form when possible.

- (1)
- | | | | | | |
|----|--------|------------|----|--------|------------|
| a. | [ba] | ‘liver’ | g. | [dʒo] | ‘hang up’ |
| b. | [ŋõ] | ‘give’ | h. | [di] | ‘woman’ |
| c. | [gũ] | ‘clay’ | i. | [ɲũ] | ‘sit’ |
| d. | [mõr] | ‘go (pl.)’ | j. | [nõ] | ‘lie down’ |
| e. | [ɲõt] | ‘slept’ | k. | [gruk] | ‘angry’ |
| f. | [bɛdʒ] | ‘honey’ | l. | [mõk] | ‘center’ |

- List all consonant sounds, and classify them in a table according to manner and place of articulation.

	Bilabial	Alveolar	Palato-alveolar	Velar
Voiceless stop		t		k
Voiced stop	b	d	dʒ	g
Nasal stop	m	n	ɲ	ŋ
Liquid		r		

- Not all combinations of consonant and vowel types are permitted in Apinayé. State any restrictions that you encounter in the data above. Hint: the restrictions have to do with voicing and nasality, not with place of articulation in either consonants and vowels, and should be quite simple to state.

Nasal consonants only occur before nasal vowels; voiced stops only occur before oral vowels; the two voiceless stops that show up in the data appear after both a nasal and an oral vowel, but there aren't any examples of voiceless stops preceding either type of vowel.

- Given the restrictions that you found, two analyses are possible to establish the phonemic system of Apinayé. What are they?

Ignoring the voiceless stops for the time being, there are two stories for the Apinayé data:

1. *Both voiced stops and nasals are phonemes of the language, while only oral vowels are phonemic, and they get nasalized by a preceding nasal stop.*
2. *Nasal and oral vowels are phonemic in the language, while only one type of voiced consonant exists (either a voiced oral stop, or a nasal stop); this consonant, if it's oral, gets nasalized by a nasal vowel following it; if it's nasal, it gets denasalized by an oral vowel following it.*

- How do the following data bear on the choice of analysis?

- | | | | | | | |
|-----|----|--------|--------------|----|------|------------|
| (2) | a. | [ʔo] | 'leaf' | f. | [kĩ] | 'hair' |
| | b. | [tu] | 'stomach' | g. | [ʔõ] | 'another' |
| | c. | [ko] | 'club' | h. | [tẽ] | 'go (sg.)' |
| | d. | [pĩ] | 'firewood' | i. | [o] | 'fruit' |
| | e. | [krõr] | 'make peace' | j. | [õ] | 'his' |

It's clear now that nasal vowels can exist independently of a preceding nasal consonant, so our second hypothesis is the correct one. It's furthermore apparent that voiceless consonants are impervious to a vowel's nasality value.

- State the conditions for the allophony of consonantal phonemes. How does the third set of data influence your statement of the environments that require each allophone?

- | | | | | | | |
|-----|----|---------|---------|----|-------|-----------|
| (3) | a. | [dvvdʒ] | 'snail' | c. | [mrõ] | 'sink in' |
| | b. | [ŋrẽk] | 'shake' | d. | [bra] | 'walk' |

From these data, it's apparent that the process of (de)nasalization described above can apply across a non-stop consonant. So the environment for a nasalization rule would have to be stated as:

- (4) $C [+voice] \rightarrow [+nasal] / \text{---}(C[+cont]) V[+nasal]$

2 Rule ordering in Friulian

(Adapted from Kenstowicz 1994)

The following alternations are attested in Friulian, a Romance language spoken in Italy (a tilde over a vowel represents main word stress):

- | | | |
|-----|---------|---------|
| (5) | wárp | 'blind' |
| | warb-ít | 'sty' |

- (6) piérd-i ‘to lose’
piért ‘he loses’
- (7) kwárp-út ‘little body’
kwárp ‘body’
- (8) dínt ‘tooth’
dint-isín ‘little tooth’

Answer the following questions in prose form where relevant.

- How can you account for the alternation between /p/ and /b/ and /t/ and /d/? Do you need a voicing or a devoicing rule?

If we suppose that /p/ undergoes voicing intervocalically, we cannot account for forms such as kwarp-út; instead, we have to propose an analysis where an underlying voiced stop devoices word-finally.

- Give the underlying forms of the stems found in the preceding data, and show what the derivation of ‘to lose’ and ‘little body’ is.

The underlying forms for the stems are: /wárb/, /piérd/, /kwárp/, /dínt/.

Underlying form	piérd	piérd-i	kwárp	kwarp-út
Final devoicing	piért	—	—	—
Surface form	piért	piérdi	kwárp	kwarpút

Now consider the following data:

- (9) lá:t ‘gone’ lát ‘milk’
pá:s ‘peace’ pás ‘step’
- (10) lá:t ‘gone’
lád-e (fem.)
nervó:s ‘nervous’
nervóz-e (fem.)
tróp ‘flock’
trop-út (dimin.)
brút ‘ugly’
brút-e (fem.)
ló:f ‘wolf’
lov-út (dimin.)
fí:k ‘fig’
fig-ón ‘big fig’

- Despite apparent minimal pairs, it is possible to predict whether a vowel will be long or short in Friulian. Provide the rule.

Vowels lengthen before a word final voiced stop — except that all of these are devoiced on the surface.

- You now have two independent rules. Can they apply in any order? Show that they can or can't by giving a derivation of 'wolf' and 'ugly'.

If devoicing applies before lengthening, we get the following:

UR	lov	brut
Devoicing	lof	—
Lengthening	—	—
Surface	lof	brut

The length of the vowel in lof is not what occurs in reality. The opposite ordering gives the correct results:

UR	lov	brut
Lengthening	lo:v	—
Devoicing	lo:f	—
Surface	lo:f	brut

- What's the underlying form of 'peace'?

/paz/

3 Extra credit: Acoustic phonetics

Record the answer sentences below in Praat as clearly as you can, and extract the pitch contour for each.

1. What happened? — John made bread.
2. Did Peter make bread? — No, *John* made bread.
3. Did John buy bread? — No, John *made* bread.
4. Did John make a cake? — No, John made *bread*.

Are there any peaks in the intonation contour of each of the sentences? Where are they in each case?