Brandon Rhodes
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LING 20101
Discussion 7

Portugese

	m. sg.	m. pl.	f. sg.	f. pl.
'fire'	fogu	fɔgʊʃ		
'people'	povu	pɔvʊʃ		
'eye'	oʎu	ɔʎʊʃ		
'new'	novu	nɔvʊʃ	nɔvɐ	nɔvɐʃ
'dead'	mortu	mɔrtʊʃ	mɔrtɐ	mɔrtɐʃ
'famous'	famozu	famɔzʊʃ	famɔzɐ	famɔzɐʃ
'all'	todu	todʊʃ	todɐ	todɐʃ
'ninth'	nonu	nonʊʃ	nonɐ	nonɐʃ
'other'	owtru	owtrʊʃ	owtrɐ	owtrɐʃ

The data is already organized in a decent way, so let's start breaking apart the data by trying to isolate the roots and any other morphemes.

m.	→	-u, -ʊ
f.	→	-ɐ
sg.	→	-∅
pl.	→	-ʃ

Okay, we see that the morphemes for FEM., SG. and PL are well-behaved, but the same is not true for MASC. What are the possibilities?

(i) There are two morphemes for MASC. underlyingly – i.e. we have nothing to say about this; it is just an idiosyncrasy of the lexicon. H_0

(ii) There is allomorphy / allophony: either (a) ʊ is realized as u or (b) u is realized as ʊ by some phonological process. H_1

Typically, the thinking is along the lines of 'try to abstract away as many generalizations as you can for the lexicon/underlying forms/etc.', implying that less structured underlying forms with rules to account for more complex surface forms is simpler than positing richly structured underlying forms. With this line of reason, let's try to advance hypothesis H_1.

- Evidence for H_1(a): ʊ → u
  - (i) u occurs in a specific environment. u ⇝ ___ # and there always is a previous tense V . Maybe a vowel tensing process?

- Evidence for H_1(b): u → ʊ

  (i) ʊ occurs in a specific environment. ʊ ⇝ ___ ʃ
  . Typologically common process of lenition (weakening of a sound) – i.e. tense → lax in the context of a 'weak' segment ʃ
  . Since ʃ is 'weak' in a way, this could be thought of as an assimilatory process; these processes are common in phonology

  (ii) We see that only u becomes lax and that ɐ is not affected by ʃ, since ɐ is already lax . . . another reason to believe the process may be assimilatory in nature

  (iii) Preceding vowel for ʊ can be tense or lax (o or ɔ), so process could only depend on the adjacent segment which is, one could argue, more 'local' than the context of previous vowel

It looks like we should try to pursue hypothesis H_1, which we will now name 'Vowel lenition'. Let's write a rule[1,2]:

Vowel lenition: Tense vowels become lax in the context of ʃ.

$$\begin{bmatrix} +syllabic \\ +tense \end{bmatrix} \rightarrow [-tense] \Big/ \underline{\quad\quad} \int$$

Okay, now we can move on to the other alternation: o vs. ɔ. There are three salient analyses:

(i) o is the underlying phoneme

(ii) ɔ is the underlying phoneme

(iii) o is underlying for some and ɔ is underlying for others; in addition, either o → ɔ or ɔ → o

The first two are less complicated than the third, so let's consider them. To get an idea of what may be the phoneme and what may be the allophone, it is always good to look at the immediate contexts in which they occur

o	ɔ
f___g	f___g
p___v	p___v
#___ʎ	#___ʎ
n___v	n___v
m___z	m___z
t___d	
#___w	

Unfortunately, this doesn't tell us much. At this point, we could posit that o is the underlying form because it has a wider distribution of contexts, all of which don't appear to be related in an obvious way. Also, we already have a process that we think is occurring: vowel weakening. If we posit that o is underlying and is realized as ɔ, this would be in line with what we have already seen. Let's try this out.

[1] Using the IPA symbol only out of laziness here, but you should use the actual featural description in your rules.

[2] Note that in the rule, I don't write *+syllabic* twice: it is common to omit any features which don't change in the feature matrix on the right side of the arrow.

Hypothesis (i): o is the underlying phoneme

What we need to do is try to adjust our previous rule or come up with another rule which accounts for the distribution of ɔ. Based on the contexts above, it isn't convincing (or at the very least obvious) that we could predict the occurrence of ɔ from the immediate context in which it occurs – i.e. the phones f, g, p, v, ʎ, m, n, z, t and d don't all share many meaningful features (maybe +*consonantal* (?)).

So, we could look beyond the immediate context (**abstraction alert**). Here, we can note that ɔ only occurs in the context of a lax vowel following it.

fɔgʊʃ
pɔvʊʃ
ɔʎʊʃ
famɔzɐʃ
mɔrtɐʃ
...
...

This looks nice, but if we are to say that o is realized as ɔ, then this idea of a following lax vowel triggering this process would run into trouble with these data points:

todʊʃ
nonʊʃ
owtrʊʃ
todɐ
nonɐ
owtrɐʃ
...
...

At this point, we either have a more complex lenition rule than we originally thought (or hoped for), or we have two lenition rules: one which is straightforward (the first one) and one which involves a more involved level of abstraction and a few exceptions. This hypothesis is not looking so good anymore.

Lesson: Don't fall in love with your analysis. Be open to ditching it.[3] PYGMALION EFFECT

Hypothesis (ii), where ɔ is the underlying vowel, runs into a similar problem at the exact same data points as hypothesis (i). I won't explicitly address the analysis here, but you should check it for yourself if you're not convinced. We have one other option left from our first batch of hypotheses; before we go hypothesis hunting again, let's try this one out.

Hypothesis (iii): o is underlying for some and ɔ is underlying for others; in addition, either o → ɔ or ɔ → o

To get an idea of which phoneme may belong to which underlying form, it will be helpful to reorganize the data. We can make two columns: one where we have o and one where we have ɔ.

[3] Or at least part(s) of it.

fogu	fɔgʊʃ
povu	pɔvʊʃ
oɣu	ɔɣʊʃ
novu	nɔvʊʃ
	nɔvɐ
	nɔvɐʃ
mortu	mɔrtʊʃ
	mɔrtɐ
	mɔrtɐʃ
famozu	famɔzʊʃ
	famɔzɐ
	famɔzɐʃ
todu	
todʊʃ	
todɐ	
todɐʃ	
nonu	
nonʊʃ	
nonɐ	
nonɐʃ	
owtru	
owtrʊʃ	
owtrɐ	
owtrɐʃ	

This becomes a bit more clear now. If we adopt the hypothesis of some forms having ɔ underlyingly and some forms having o underlyingly, we would probably say the last three groups have o as the vowel in the underlying form and the first few have ɔ as the vowel underlyingly. Now, we would just have to account for the deviant o occurring in the masculine singular form of each of the first few groups. The fact that we have now isolated the problem to a single context (masculine singular), which is the presence of -u, suggests that we are on the right track. Since this process is not immediately local, we need to make an abstraction to make it local (**abstraction alert**). Suppose we have a 'tier' where only vowels can exist.

Vowel tensing: A lax vowel becomes tense if the following vowel on the vowel tier is tense.

$$\begin{bmatrix} +syllabic \\ -tense \end{bmatrix} \rightarrow [+tense] \Big/ \underline{\quad\quad} \begin{bmatrix} +syllabic \\ +tense \end{bmatrix}$$

The upshot is that we have two straightforward rules which account for all of this data; however, note that we need one last addition to the theory: we need to posit that the vowel lenition process occurs *before* and the vowel tensing process. If it didn't, then we would expect to see o in a form like *fog*-MASC-PL.

Summary and sample derviations:

Underlying forms:

roots		affixes	
'fire'	fɔg	m.	-u
'people'	pɔv	f.	-ɐ
'eye'	ɔʎ	sg.	-∅
'new'	nɔv	pl.	-ʃ
'dead'	mɔrt		
'famous'	famɔz		
'all'	tod		
'ninth'	non		
'other'	owtr		

Word template:

$$root- \text{ GENDER } - \text{ NUMBER}$$

Rules:

Vowel tensing: A lax vowel becomes tense if the following vowel on the vowel tier is tense.

$$\begin{bmatrix} +syllabic \\ -tense \end{bmatrix} \rightarrow [+tense] \Big/ \underline{\quad} \begin{bmatrix} +syllabic \\ +tense \end{bmatrix}$$

Vowel lenition: Tense vowels become lax in the context of ʃ.

$$\begin{bmatrix} +syllabic \\ +tense \end{bmatrix} \rightarrow [-tense] \Big/ \underline{\quad} \text{ ʃ}$$

Ordering:

Vowel lenition > Vowel tensing

Sample derivations:

underlying form	Vowel lenition	Vowel tensing	surface form
/fɔg-uʃ/		fog-u	[fog-u]
/famɔz-uʃ/	famɔz-ʊʃ		[famɔz-ʊʃ]
/famɔz-u/		famoz-u	[famoz-u]
/tod-u/			[tod-u]

Sample derivation with incorrect rule ordering:

underlying form	Vowel tensing	Vowel lenition	surface form
/fɔg-uʃ/	fog-uʃ	fog-ʊʃ	[fog-ʊʃ]