Class 5: Structure above the segment V

To do
- ☐ Talk to me by the end of this week about your project topic
- ☐ Next homework assignment will be posted by Friday, due next Friday (Feb. 2)
- ☐ Next reading is Moreton 2008, study questions due Monday (Jan. 29)

Overview
More about the Prosodic Word = Phonological Word = PWord, then down to the CV skeleton

1 English example

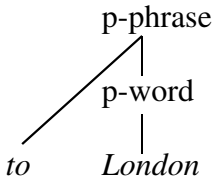
- We've seen PWords that are smaller than a "word"
  - Samoan compound words: $[\text{stem}]_{\text{PWd}}$ $[\text{stem}]_{\text{PWd}}$
- Could a PWord ever be bigger than a "word"?

- Many English function words (i.e., not Nouns, Verbs, or Adjectives) have weak and strong forms.

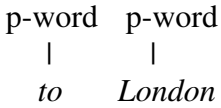
	strong	*weak*
to	tʰu	tʰə
at	æt	ət
for	foɹ	fɚ
a	eɪ	ə
and	ænd	n̩

? I'm going ____ London next summer. Where are you going ____?
I'm looking ____ Campbell Hall. What are you looking ____?

- Selkirk 1995 proposes two candidate structure types:



to isn't in a p-word
→ can't be footed
→ unstressed
→ [tʰə]



to is a p-word
→ must be footed
→ stressed
→ [tʰu]

- To avoid cluttering the tableau, assume that the "t[u]"s form a foot with stress; "t[ə]"s are unfooted. (I'll draw a couple on the board for your reference.)

? Fill in the tableau. What's the winner?

	to London	ALIGN (LexWd,L,PWd,L)	ALIGN (PWd,R,LexWd,R)	FOOTMUST BEDOMINATED BYPWORD
a	[t^{h}**u** London]$_{PWd}$			
b	[t^{h}**ə** London]$_{PWd}$			
c	t^{h}**u** [London]$_{PWd}$			
d	t^{h}**ə** [London]$_{PWd}$			
e	[t^{h}**u**]$_{PWd}$ [London]$_{PWd}$			
f	[t^{h}**ə**]$_{PWd}$ [London]$_{PWd}$			

(Focus changes things: *I need a flight TO London, not FROM London*.)

? *looking at*: draw a phonological tree that causes *at* to be pronounced in its full form

? Fill in the tableau (we needed to add some constraints). Assume "[æ]t" is footed, "[ə]" isn't. What's the winner?

	looking at	ALIGN (LexWd,R, PWord,R)	ALIGN (PPhrase,R, Pwd,R)	ALIGN (PWd,R, LexWd,R)	FOOTMUST BEDOMINATED BYPWORD	PWORDMUST CONTAIN FOOT
a	[looking **æt**]$_{PWd}$					
b	[looking **ət**]$_{PWd}$					
c	[looking]$_{PWd}$ [**æt**]$_{PWd}$					
d	[looking]$_{PWd}$ [**ət**]$_{PWd}$					
e	[looking]$_{PWd}$ **æt**					
f	[looking]$_{PWd}$ **ət**					

⇒ *looking* needs to end a p-word, but phrase also wants to end w/ a p-word, so *at* must end its own p-word.

2 Dutch example (Gussenhoven & Jacobs 1998, p. 250)

- Nothing radically different here, but more practice and more evidence
- In Dutch, resyllabification applies across some morpheme boundaries but not others.
  - I'm including an inserted glottal stop since I think that's what's intended as the evidence for syllabification.

[ʔɔnt**.**[**ʔ**ɛi.χən]$_V$]$_V$ 'dispossess' [[kɛrk]$_N$**.**[**ʔ**œyl]$_N$]$_N$ 'barn owl' [[teː.kə.n]$_V$ ɪŋ]$_N$ 'drawing'
[ʔɔn**.**[**ʔ**eː.vən]$_A$]$_A$ 'uneven' [[rɛin]$_N$**.**[**ʔ**aː.k]$_N$]$_N$ 'Rhine barge' [[ʊɑn.də.l]$_V$ aːr]$_N$ 'walker'

- G&J propose that resyllabification is blocked across a p-word boundary (parentheses below mark p-words)...

(ʔɔnt.)-(ʔɛi.χən)	(kɛrk.)-(ʔœyl)	(teː.kə.nɪŋ)
(ʔɔn.)-(ʔeː.vən)	(rɛin.)-(ʔaː.k)	(ʊɑn.də.laːr)

? Let's fill in the alignment constraints:

/[ɔn [ɛːvən]$_A$]$_A$/				DEP-ʔ	NOCODA
☞ *a* (ʔɔn.)(ʔɛː.vən)					
b (ʔɔ.n)(ɛː.vən)					
c (ʔɔ.nɛː.vən)					

/[[teːkən]$_V$ ɪŋ]$_N$ /				DEP-ʔ	NOCODA
☞ *d* (teː.kə.nɪŋ)					
e (teː.kən.)(ʔɪŋ)					
f (teː.kə.)(nɪŋ)					

? What should happen to function words, like pronouns and determiners, assuming the same ranking?

/[rip]$_V$ [ən]$_{det}$ [kɑt]$_N$/ called a cat				DEP-ʔ	NOCODA
g (riːp.)(ʔən.)(kɑt)					
h (riː.pən)(kɑt)					

3 More evidence in Dutch

3.1 Long-vowel diphthongization (G & J p. 252)

- /eː, øː, oː/ become [eᵊ, øᵊ, oᵊ] before [r], regardless of syllabification:

[meᵊr]$_N$	‘more’	[køᵊ.raːl]$_N$	‘coral’
[χøᵊr]$_N$	‘smell’	[[koᵊr]$_V$ ɪŋ]$_N$	‘test’

? Why doesn’t the alternation apply here:

[[[m**e**ː **[r**ɛiz]$_V$]$_V$ ən]$_V$	‘to accompany’	[[k**øː]$_N$ [r**ɪŋ]$_N$]$_N$	‘cue ring’
[[milj**øː]$_N$ [r**iːziːkoː]$_N$]$_N$	‘environmental hazard’	[ne**ːoː [[r**eːv]$_N$ iaːns]$_A$]$_A$	‘neo-Revian’[1]

3.2 Conjunction reduction (see also Booij 1985)

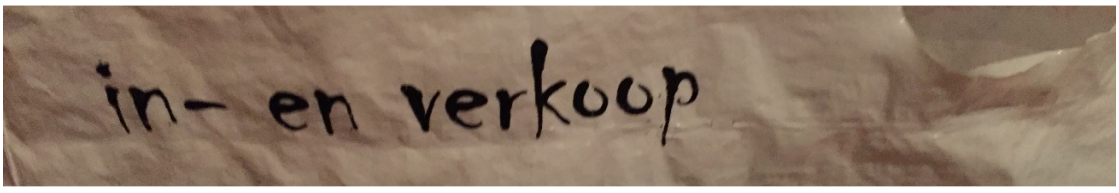
just spelling here, not IPA

[[lɑnd]$_N$[bɑu]$_N$]$_N$ ɛn [[tœyn]$_N$[bɑu]$_N$]$_N$	*optionally becomes*	lɑnd- ɛn tœynbɑu
agriculture and horticulture		agri- and horticulture
but: [[ɑpsʏrd]$_A$itɛit]$_N$ ɛn [[bɑnaːl]$_A$itɛit]$_N$	*cannot become*	*ɑpsʏrd- ɛn bɑnaːlitɛit
absurdity and banality		absurd- and banality

? Why not * ɑpsʏrd- en bɑnaːlitɛit?

? Check that it works for prefixed words too—data point from shopping bag from Record Mania in Amsterdam:

[ɪn [koːp]$_V$]$_N$ ɛn [vɛr [koːp]$_V$]$_N$
‘buying and selling’ *can become*



[1] Revian = akin to or evoking the style of Dutch writer Gerard Reve

4 The phonological word in some other languages

- Sanskrit, Turkish, Hungarian, Malagasy, Tagalog, Bengali, and Italian have pretty much the same p-word boundaries as Samoan or Dutch, with some slight wrinkles.

- In Italian, for example, only prefixes that are semantically transparent stand outside the stem's p-word (Peperkamp 1997, van Oostendorp 1999):
  (a)-(sociale) 'asociale' *but* (re-sistenza) 'resistance'

  - Provides a way to test Italian speakers' morphological intuitions: see Baroni 2001 on N. Italian intervocalic voicing of /s/, which applies only if the surrounding vowels are in the same p-word.

- *Yidin*^{y} (Australian language, with very few remaining speakers. Nespor & Vogel 1986, data from Dixon 1977)

  - Penults of odd-syllabled p-words lengthen—no long vowels otherwise.

gu.da:.ga	'dog'	gu.da.ga.-gu	'dog-*purp.*'
mu.ɖam	'mother'	mu.ɖa:m.-gu	'mother-*purp.*'
ma.ɖi:n.da-ŋ	'walk up-*pres.*'	ga.li:.-na	'go-*purp.*'
ga.liŋ	'go-*pres.*'	ŋu.naŋ.ga.ra:-n.da	'what-*dat.*'

? Based on the data above, are suffixes part of the p-word?

? So what should we make of examples like these, with longer suffixes:

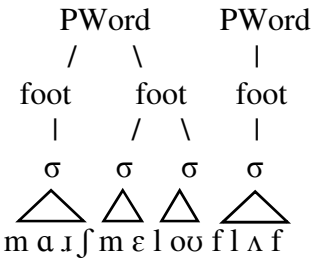
gu.ma:.ri-da.ga:.-ɲu 'red-*inch.-past*' ma.ɖi:n.da-ŋa.liŋ 'walk up-*pres*'

5 Do we need the p-word?

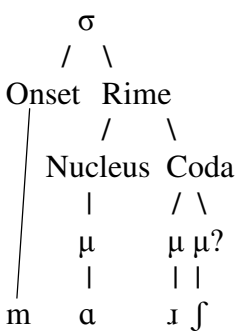
- In 2006, a group of us spent about 40 hours debating the issue (see www.linguistics.ucla.edu/people/zuraw/courses/prosword_2006.html for handouts). Results were inconclusive:
  - Often, interleaving phonology and morphology can do the job (add some affixes too late for certain processes to see them).
  - But there was a residue of cases where it seemed like we really might need the p-word. The last handout at the link above sums up the pro and con arguments.

6 Structure between the segment and the syllable?

- Let's change gears and head back down the prosodic structure



- Should there be more structure between the σ and the segment?
  - This much is pretty typical:



- This would mean that each segment (feature bundle) hooks directly to a mora or a syllable position
- But there's a proposal to add one more layer

7 The CV skeleton

- Instead of this:

–syllabic	+syllabic	–syllabic	–syllabic
+consonantal	–consonantal	+consonantal	+consonantal
+sonorant	+sonorant	+sonorant	–sonorant
+labial	–labial	–labial	–labial
...	...	...	...

- Something like this:

C	V	C	C
+consonantal	–consonantal	+consonantal	+consonantal
+sonorant	+sonorant	+sonorant	–sonorant
+labial	–labial	–labial	–labial
...	...	...	...

- That is, don't treat syllabicness as a feature. Treat it as a separate layer of structure.

8 Arguments for the CV skeleton

8.1 Skeletal structure can be persistent

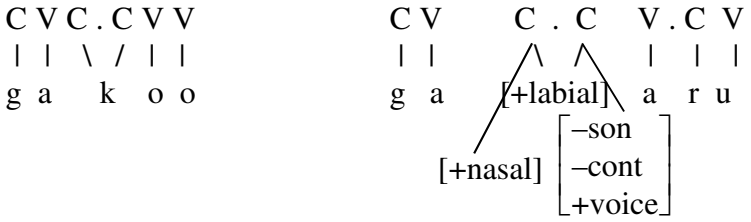
- Bakwiri (aka Mokpwe, Niger-Congo language from Cameroon with 32,200 speakers) syllable-reversing language game (Bagemihl 1989, data from Hombert 1973):

normal	*reversed*	
lìjé	jèlí	‘stone’
lùùⁿgá	ⁿgààlú	‘stomach’
ẓééjà	jááẓè	‘burn’
ʔézèè	ẓeʔèè[2]	‘is is not’
lìòβá	βààlíó	‘door’

? Let’s draw before-and-after representations with a skeletal tier

8.2 A feature can be licensed by one of its multiple associations

- Japanese (Ito 1986): place features in a coda are OK only if they belong to a place-assimilated nasal or the <u>first half of a geminate</u>:



- Explanation: place features must be associated to (= are licensed by) an onset/prevocalic C

[2] I don’t know what’s up with the tone on the first syllable; maybe it’s a typo.

8.3 Geminate inalterability: shared structure is special

- Consider first the <u>linear</u> versions of some optional rules from Toba Batak, Hayes 1986b (aka Batak Toba, Austronesian language from Indonesia with 2 million speakers):

glottal formation $\begin{bmatrix} -\text{son} \\ -\text{cont} \\ -\text{voice} \end{bmatrix} \rightarrow$ ʔ / __ C

I think you did this as a problem last quarter

/ganu**p** taɔn/	→	ganu**ʔ** taɔn	‘every year’
/dɔhɔ**t** lali i/	→	dɔhɔ**ʔ** lali i	‘and the hen-harrier’
/hala**k** batak/	→	hala**ʔ** batak	‘Batak person’
/la**p** piŋgɔl/	→	la**ʔ** piŋgɔl	‘wipe off the ear’
/maŋihu**t** taɔn/	→	maŋihu**ʔ** taɔn	‘according to the year’
/hala**k** kɔrɛa/	→	hala**ʔ** korɛa	‘Korean person’

n-h *rule* n h → k k

/maŋa**n** **h**alak i/	→	maŋa**k** **k**alak i

? What is the order of the two above rules? (again, assume linear everything for now) Let’s start a Hasse diagram of rule ordering.

denasalization $\begin{bmatrix} \text{C} \\ +\text{nas} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{nas} \\ -\text{voice} \end{bmatrix}$ / — $\begin{bmatrix} \text{C} \\ -\text{voice} \end{bmatrix}$

/maŋinu**m** tuak/	→	maŋinu**p** tuak	‘drink palm wine’
/mana**ŋ** pulpen/	→	mana**k** pulpen	‘or a pen’
/holo**m** saɔtik/	→	holo**p** saɔtik	‘somewhat dark’
/mananɔ**m** piriŋ/	→	mananɔ**p** piriŋ	‘bury a dish’
/mamɛrɛ**ŋ** kalabbu/	→	mamɛrɛ**k** kalabbu	‘look at a mosquito net’

? Add denasalization to the ordering

h-*assimilation* [–voice] h → 1 1
1 2

/marisap **h**ita/	→	marisap **p**ita	‘let us smoke’
/dɔhɔt **h**alak/	→	dɔhɔt **t**alak	‘and a person’
/modom **h**alak i/	→	modop **p**alak i	‘the man is sleeping’
/dibɛrɛŋ **h**alak i hɔrbɔ i/	→	dibɛrɛk **k**alak i hɔrbɔ i	‘the man saw the buffalo’

? Add *h*-assimilation to the ordering

? More data—can we patch up the linear account to handle them?

/di**k**tatɔr/[3]	→	di**ʔ**tatɔr	‘dictator’
/rɔ**t**rɔt/	→	rɔ**ʔ**rɔt	‘to knock down’
vs.			
/dɛ**k**kɛ/	→	dɛ**k**kɛ	‘fish’
/pi**t**tu/	→	pi**t**tu	‘door’
/a**ŋ**sa/	→	a**k**sa	‘fish’
vs.			
/ada**t**+ta/	→	ada**ʔ**ta	‘our custom’
/suddu**t**+ta/	→	suddu**ʔ**ta	‘our generation’

- Hayes’s solution (spelling it out explicitly gets complex—see the paper): assimilation creates a **shared structure**, which doesn’t meet the structural description of the glottal-formation rule (“geminate inalterability—see also Schein & Steriade 1986, Hayes 1986b).

? Let’s try some examples.

To sum up
- We’ve gotten some practice with the PWord, and seen arguments for one more above-the-segment structure, the CV skeleton.

Next time
- We reach down into phonology’s interface with phonetics, and later, structure below the segment.

[3] How do we know this is the underlying form? Because in careful speech, all these rules are optional.

References

Bagemihl, Bruce. 1989. The Crossing Constraint and "backwards languages." *Natural Language and Linguistic Theory* 7. 481–549.

Baroni, Marco. 2001. The representation of prefixed forms in the Italian lexicon: Evidence from the distribution of intervocalic [s] and [z] in northern Italian. In Geert Booij & Jaap van Marle (eds.), *Yearbook of Morphology 1999*, 121–152. Dordrecht: Springer.

Booij, Geert E. 1985. Coordination reduction in complex words: a case for prosodic phonology. In Harry Van der Hulst & Norval Smith (eds.), *Advances in Nonlinear Phonology*, 143–160. Dordrecht: Foris.

Dixon, Robert M. W. 1977. *A Grammar of Yidiny*. Cambridge: Cambridge University Press.

Gussenhoven, Carlos & Haike Jacobs. 1998. *Understanding Phonology*. Oxford: Oxford University Press.

Hayes, Bruce. 1986a. Assimilation as spreading in Toba Batak. *Linguistic Inquiry* 17. 467–99.

Hayes, Bruce. 1986b. Inalterability in CV phonology. *Language* 62. 321–251.

Hombert, Jean-Marie. 1973. Speaking backwards in Bakwiri. *Studies in African Linguistics* 4. 227–236.

Ito, Junko. 1986. Syllable Theory in Prosodic Phonology. University of Massachusetts, Amherst.

Nespor, Marina & Irene Vogel. 1986. *Prosodic Phonology*. Dordrecht: Foris.

Oostendorp, Marc van. 1999. Italian s-voicing and the structure of the phonological word. In S.J. Hannahs & Mike Davenport (eds.), *Issues in Phonological Structure*, 197–214. Benjamins.

Peperkamp, Sharon. 1997. *Prosodic Words*. The Hague: Holland Academic Graphics.

Schein, Barry & Donca Steriade. 1986. On geminates. *Linguistic Inquiry* 17. 691–744.

Selkirk, Elisabeth. 1995. The prosodic structure of function words. In Jill Beckman, Laura Walsh Dickey & Suzanne Urbanczyk (eds.), *University of Massachusetts Occasional Papers: Papers in Optimality Theory*, 439–470. Amherst, Mass.: GLSA Publications.