Class 12: Upward interfaces: phonology and morphology II, paradigms and beyond

To do
- ☐ Samoan prosodic morphology homework due Friday
- ☐ I know the syllabus has a paradigms homework listed next, but let's skip it—work on your projects instead! (One last homework due next week,
- ☐ Selkirk reading question due Monday

Overview. Phonological relationships between words: which words relate to which, and how?

1 Review of cyclicity in lexical phonology: Palestinian Arabic (Brame 1974)

- Verbs without objects:

subject	*'study'*	*'understand'*
2sg. masc.	da.rás-t	fhím-t
2sg. fem.	da.rás.-ti	fhím.-ti
3sg. masc.	dá.ras	fí.him
3sg. fem.	dá.ra.s-at	fíh.m-at
1pl.	da.rás.-na	fhím.-na
2pl.	da.rás.-tu	fhím.-tu
3pl.	dá.ra.s-u	fíh.m-u

? Give rules for stress in this language, based on the 'study' paradigm (prose is fine)

? Give a rule for the V~Ø alternations.

? Determine the ordering of the two rules.

- Verbs with objects: a cyclic analysis treats the without-object form, plus object suffix, as the input to the next cycle:

	/fihim/	'understand'
First cycle morphology:	fihim+at	'she understood'
First cycle phonology:	/fihim+at/ → [fíhmat]	
Second cycle morphology:	fíhmat+ni	'she understood me'
Second cycle phonology	/fíhmat+ni/ → [fihmátni]	

object	*'he understood X'*	*'she understood X'*	*'You (masc.) understood X'*
1sg.	fi.hím.-ni	fih.m-át.-ni	fhím-t.-ni
2sg. masc.	fíh.m-ak	fíh.m-a.t-ak	fhím-.t-ak
2sg. fem.	fíh.m-ik	fíh.m-a.t-ik	fhím-.t-ik
3sg. masc.	fíh.m-u	fíh.m-a.t-u	fhím-.t-u
3sg. fem.	fi.hím.-ha	fih.m-át.-ha	fhím-t.-ha
1pl.	fi.hím.-na	fih.m-át.-na	fhím-t.-na
2pl.	fi.hím.-kum	fih.m-át.-kum	fhím-t.-kum
3pl.	fi.hím.-hum	fih.m-át.-hum	fhím-t.-hum

? Explain the [i] in *fihím-ni*

? Explain the stress in *fíhmatak*.

- Moral: the lexical phonological rules apply after each Word-Formation Rule, things that happened at an earlier stage in the morphological derivation can carry over to later stages.
- Let's see if we can deal with this kind of thing in fully parallel OT—i.e., no levels or strata…

2 Vowel lowering in Saipanese Chamorro (Chung 1983, Crosswhite 1998)

Vowel lowering in main-stressed, closed syllables (where the V must be short)

ˈmet.gut	'strong'	ˈp͡od.duŋ	'fall'
ma.ˈneŋ.ŋiŋ	'cold'	ˈtsoʔ.gʷi	'do'
ˈpiː.saw	'fishing line'	ˈuː.t͡san	'rain'
im.ˈpat.t͡su	'bored'	ˈmuː.mu	'fight'
dis.ˈpas.ju	'slow'	gub.ˈjet.nu	'governor'
ˈlaː.pis	'pencil'	la.ˈpes.su	'my pencil'
hu.ˈgan.du	'play'	ˌhu.gan.ˈdon.ɲa	'his playing'
ma.ˈlæː.guʔ	'wanting'	ˌma.læ.ˈgoʔ.mu	'your wanting'

- Foreshadowing some of Crosswhite's later work on vowel reduction, vowels want to be more sonorous if stressed (cf. Kenstowicz 1994, where stress is attracted to sonorous vowels):

/mitgut/ *or* /metgut/	IDENT-IO (low)	*TRIMORAIC SYLL	*PEAK$_{Word}$/i,u	PERI-PHERAL	*PEAK$_{Wd}$/e,o	*PEAK$_{Wd}$/a,æ	*PEAK$_{Wd}$/V:
☞ ˈmet.gut				*	*		
ˈmit.gut			*!				
ˈmiː.t.gut		*!					*
ˈmæt.gut	*!					*	

- In non-main-stress syllables, PERIPHERAL rules out mid vowels.
- Not shown: bottom-ranked IDENT(high)

3 Secondary-stressed vowels (still Chamorro)

- Lowering is optional in 'rhythmic' secondary stress (initial secondary stress that occurs if there would otherwise be an initial lapse of 2 syllables):

t**i**n.ˈta.guʔ	'messenger'	ˌt**e**n.ta.ˈgóʔ.+ta	*or*	ˌt**i**n.ta.ˈgoʔ.+ta	'our (incl.) m.'
m**u**n.ˈdoŋ.gu	'cow stomach'	ˌm**o**n.duŋ.ˈgo+n.ŋa	*or*	ˌm**u**n.duŋ.ˈgo+n.ŋa	'his cow stomach'

- Crosswhite proposes that *PEAK$_{\textbf{Foot}}$/i,u is ranked variably with PERIPHERAL.

- But there is also derived (cyclic) secondary stress, and there the vowel can't be optionally high, contrary to what the analysis so far predicts:

ˈ**e**t.ti.gu	'short'	ˌ**e**t.ti.ˈgo+n.ŋa	'shorter'
i.ˈn**e**ŋ.ŋu.luʔ	'peeping'	i.ˌn**e**ŋ.ŋu.ˈloʔ.+hu	'my peeping'
ˈ**o**t.ti.mu	'end'	ˌ**o**t.ti.ˈmo+n.ŋa	'his end'

4 Crosswhite's Output-Output Correspondence analysis

> HEAD-IDENT-BaseAffixed(high): a segment in an affixed form must match in [high] to its correspondent segment in the morphological base if that base segment is in the prosodic-word head.

? Why is it [i.ˌneŋ.ŋu.ˈl**o**ʔ.+hu] and not *[i.ˌneŋ.ŋu.ˈl**u**ʔ.+hu] then?

? What determines the placement of the secondary stress?

(There's lots more: see Crosswhite)

5 What qualifies as a base? (in B-A correspondence)

- Benua (1997): "The base is the **independent word** identified with the string that **undergoes morphological derivation** [i.e., it's up to the morphology]; in affixation, the base is the word identified with the **string adjacent to the affix**. […] Often, the base is the word that is minimally less morphologically complex than the derived word, so that the base consists of a subset of the derived word's morphemes. But this kind of subset relation does not always hold. An obligatorily inflected word can serve as the base of another inflected word, and the base's inflection is neither morphologically nor phonologically present in the derived word."

- Kager (1999): "a form that is compositionally **related** to the affixed word in a morphological and a semantic sense. (The meaning of the affixed form must contain all grammatical features of its base.) Moreover, the base is a **free form**, i.e. a word. This second criterion implies that a base is always an output itself."

  - In Palestinian Arabic case, no base *fíhim* to protect the first vowel from deletion in *fhímna* 'we understood', because there is no freestanding word with a subset of *fhímna*'s morphological features.

? Are these Polish data (Benua p. 241, orig. from Kraska-Szlenk 1995) a problem? (o → u / closed syllable with certain coda Cs)

'cow'	*Singular*	*Plural*
Nom.	kr[o].wa	kr[o].wy
Gen.	kr[o].wy	kr[u]w
Dat.	kr[o].wie	kr[o].wom
Acc.	kr[o].wę	kr[o].wy
Inst.	kr[o].wą	kr[o].wami
Loc.	kr[o].wie	kr[o].wach
Voc.	kr[o].wo	kr[o].wy

'cow'-diminutive	*Singular*	*Plural*
Nom.	kr[u]w.ka	kr[u]w.ki
Gen.	kr[u]w.ki	**kr[u].wek**
Dat.	kr[u]w.ce	kr[u]w.kom
Acc.	kr[u]w.ke	kr[u]w.ki
Inst.	kr[u]w.ka	kr[u]w.kami
Loc.	kr[u]w.ce	kr[u]w.kach

- Benua proposes that the gen. pl. is derived from the nom. pl., but that morphological constraints prevent both suffixes from surfacing. (What's the other possible base for this form, and does that solve the problem?)

6 More examples from Benua—alternative explanations?

- Portuguese (p. 242, orig. from Rainer 1996) [spelling]:

Singular	*Sg.Diminutive*	*Plural*	*Pl.Diminutive*	
cão	cãozinho	cães	cãezinhos	'dog'
flor	florzinha	flores	florezinhas	'flower'

- Cibemba (p. 243, orig. from Hyman 1994): the "upper-high" vowel [ị] causes changes in preceding consonant:

Root	*Causative*	*Causative-Applicative*	
lee**p**	lee**f**-ị	lee**f**-es-ị	be long/lengthen/lengthen for
lo**b**	lo**f**-ị	lo**f**-es--ị	be extinct/exterminate/exterminate for
fii**t**	fii**s**-ị	fii**s**-is--ị	be dark/darken/darken for
li**l**	li**s**-ị	lis-is--ị	cry/make cry/make cry for

7 The split base—lexical conservatism

- Steriade (1999) on French: 'liaison' can occur at a word-boundary hiatus:

masc.		*masc. liaison*	
nuv**o** maʁi	'new husband'	nuv**ɛl** ami	'new friend'
b**õ** maʁi	'good husband'	b**ɔn** ami	'good friend'
pəti maʁi	'small husband'	pəti**t** ami	'small friend'

- Some of these forms are hard to derive by pure phonology:

/nuvo ami/	*VV	MAX-V	DEP-C	IDENT(Vfeatures)
nuvo ami	*!			
nuv ami		*!		
💣 nuvot ami			*	
☹ nuvɛl ami			*	*!

- But Steriade notes that these liaison forms are just like the feminine forms:

masc.	*masc. liaison*	*fem.*	
nuvo	nuvɛl	nuvɛl	'new'
bõ	bɔn	bɔn	'good'
pəti	pətit	pətit	'small'

- She proposes that the principle of **lexical conservatism** is higher ranked than, say, IDENT(Vfeatures)-IO, or any markedness constraints that are violated by inserting [l] instead of default [t]:

  "Lex C]: There is a listed allomorph of μ L(μ) such that if there is an absolute final C in the T(μ) [target], C has an absolute final, featurally identical correspondent C' in L(μ)."

/nuvo ami/ [nuvɛl] exists	LEX C]	*VV	MAX-V	DEP-C	IDENT(Vfeatures)
nuvo ami		*!			
nuv ami	*!		*		
nuvot ami	*!			*	
☞ nuvɛl ami				*	*

- This also explains why some words have no special liaison form:

masc.	*masc. liaison*	*fem.*	
ʒɔli	ʒɔli	ʒɔli	'new'

/ʒɔli ami/	LEX C]	*VV	MAX-V	DEP-C	IDENT(Vfeatures)
☞ ʒɔli ami		*			
ʒɔl ami	*!		*		
ʒɔlit ami	*!			*	

- And why it's not the case that the feminine allomorph has to be adopted wholesale:

masc.	*masc. liaison*	*fem.*	
pʁɔʃɛ̃	pʁɔʃɛ̃n ~ pʁɔʃɛn	pʁɔʃɛn	'next'
divɛ̃	divɛ̃n ~ divin	divin	'divine'
so	sot ~ sɔt	sɔt	'silly'

"Lex ∀: There is a L(μ), such that every segment in T(μ) has a featurally identical correspondent in L(μ)"

/ divɛ̃ ami/	LEX C]	*VV	IDENT(Vfeatures)	LEX ∀
divɛ̃ ami		*!		
div ami	*!			
divɛ̃t ami	*!			
☞ divɛ̃n ami				*
☞ divin ami			*	

(Actually, Steriade does something a bit different from IDENT-IO—and as you read there's more to the story…)

8 If time, more split base: Burzio 1998

- Argues that Italian adjectives (in *–ivo*) and agentive nouns (in *–ore*) and are based on both the infinitive and the past participle:

	Infinitive	*Participle*	*-ore/-ivo derivative*	
adapt	adatt-áre	adatt-át-o	adatt-at-óre	regular case, for each conjugation
provide	provved-ére	provved-út-o	provved-it-óre	
sell	vénd-ere	vend-út-o	vend-it-óre	
mail	sped-íre	sped-ít-o	sped-it-óre	
compress	comprím-ere	comprés-s-o	compres-s-óre	syncopated participles of –ĕre conjugation
win	vínc-ere	vín-t-o	vìn**c**-it-óre	
ascend	ascénd-ere	ascé-s-o	asce**n**-s-óre	
exceed	eccéd-ere	ecced-út-o	ecces-s-ívo	irregular: syncope in derivative only
possess	possed-ére	possed-út-o	posses-s-óre	
aggress	aggred-íre	aggred-ít-o	aggres-s-óre	

The analysis is complicated, but essentially Burzio argues that…

- Syncope in <u>participles</u> results from wanting to stress both the root vowel and the *–ut* vowel, for O-O faithfulness reasons
  - That's why it happens only in the *–ĕre* conjugation (where root is stressed in infinitive).
  - Only way to achieve it is to combine root-final syllable and participle suffix into a single syllable
  - This can force consonant deletions to avoid an illegal consonant cluster

- Lexically variable syncope in <u>derivatives</u> happens because both *suffixes'* vowels want to be stressed.
  - Deleting one of them is a way around that requirement

- Lexically variable "revoked syncope" (as in *vìncitóre*) happens because the root's vowel and the suffix's vowel both want to be stressed
  - a "buffer syllable" is needed to allow both to be stressed without clash
  - the *it* is an unstressed allomorph of the participial suffix, and the *c* is recruited from the infinitive to preserve the coda status of the preceding *n*

- *Ascensore* is a compromise in which the root vowel isn't kept stressed, but at least it's made heavy (by recruiting a segment from another allomorph).

9 More, contrasting views on basehood, FYI

- Albright (2002 and several works thereafter)
  - A paradigm has to have a single base—and this replaces the underlying representation
  - Anything that can't be predicted from that base has to be memorized as exceptional
  - Learners choose the base mainly according to its informativeness: minimize how much exceptional stuff you have to memorize

- Albright's evidence comes mainly from *levelling* changes that happen to paradigms diachronically
  - Where once there were two allomorphs, now there is one
  - E.g., if Polish 'cow' became all *krow* or all *kruw*
  - Why should levelling happen?
    - any deviation from the base (unless fully phonologically predictable) is memorized as exceptional
    - but sometimes the next generation fails to learn/use some of those exceptional facts
    - thus the whole paradigm comes to look more like the base

- Bowers (2012, 2015)
  - Learners *can* construct an underlying form that pieces together information from multiple parts of the paradigm
  - But, there are limits on this process, leading to levelling and other changes

10 If extra time: see how far we get with split base in Hebrew truncated (colloquial) imperatives: Bat-El 1999/2002

10.1 Data

	Masculine			Feminine		
	Future	TI	*Normative Imperative*	Future	TI	*Normative Imperative*
'to close'	ti-**sgor**	sgor	*sgor*	ti-**sgeri**	sgeri	*sigri*
'to cut'	ti-**gzor**	gzor	*gzor*	ti-**gzeri**	gzeri	*gizri*
'to remember'	ti-**zkor**	zkor	*zxor*	ti-**zkeri**	zkeri	*zixri*
'to hurry'	ti-**zdarez**	zdarez	*hi-zdarez*	ti-**zdarzi**	zdarzi	*hi-zdarzi*
'to approach'	ti-**t-karev**	tkarev	*hi-t-karev*	ti-**t-karvi**	tkarvi	*hi-t-karvi*
'to undress'	ti-**t-paʃet**	tpaʃet		ti-**t-paʃti**	tpaʃti	
'to dress'	ti-**t-labeʃ**	tlabeʃ		ti-**t-labʃi**	tlabʃi	
'to saw'	ti-**tfor**	tfor	*tfor*	ti-**tferi**	tferi	*tifri*
'to guard'	ti-**ʃmor**	ʃmor				
'to write'	ti-**xtov**	**x**tov		ti-**xtevi**	**x**tevi	
'to open'	ti-**ftax**	**f**tax	*ptax*	ti-**ftexi**	**f**texi	*pitxi*
'to run away'	ti-**vrax**	**v**rax	*brax*	ti-**vrexi**	**v**rexi	*birxi*
'to swear'	**t**i-**ʃav**a	tʃava	*hi-ʃava*	**t**i-**ʃav**(ʔ)**i**	tʃavi	*hi-ʃavʔi*
'to clear'	**t**e-**fane**	t**f**ane	*pane*	**t**e-**fane**	t**f**ani	*pani*
'to turn'	**t**e-**sovev**	tsovev	*sovev*	**t**e-**sovevi**	tsovevi	*sovevi*
'to tell'	**t**e-**saper**	tsaper	*saper*	**t**e-**sapri**	tsapri	*sapir*
'to enter'	**t**i-**kanes**	tkanes	*hi-kanes*	**t**i-**kansi**	tkansi	*hi-kansi*

'to refuse'	**te-sarev**	tsarev	*sarev*	**te-sarvi**	tsarvi	*sarvi*
'to search'	**te-xapes**	t**x**apes				
'to raise'	**te-gadel**	tgadel	*gadel*	**te-gadli**	tgadli	*gadli*
'to take'	ti-**kax**	kax	*kax*	ti-**kxi**	kxi	
'to approach'	ti-**gaʃ**	gaʃ	*gaʃ*	ti-**gʃi**	gʃi	
'to give'	ti-**ten**	ten	*ten*	ti-**tni**	tni	
'to sit'	te-**ʃev**	ʃev	*ʃev*	te-**ʃvi**	ʃvi	
'to get up'	ta-**kum**	kum	*kum*	ta-**kúmi**	kúmi	
'to run'	ta-**ruts**	ruts	*ruts*	ta-**rútsi**	rútsi	
'to put down'	ta-**sim**	sim	*sim*	ta-**símí**	símí	
'to bite'	**ti-nʃax**	tinʃax	*neʃax*			
'to breath'	**ti-nʃom**	tinʃom	*neʃom*			
'to find'	**ti-mtsa**	timtsa	*metsa*			
'to erase'	**ti-mxak**	timxak				
'to dress'	**ti-lbaʃ**	tilbaʃ				
'to learn'	**ti-lmad**	tilmad				
'to dance'	**ti-rkod**	tirkod				
'to write'	**ti-rʃom**	tirʃom				
'to descend'	te-**red**	red	*red*	te-**rdí**	r**é**di	*redí*
'to go away'	te-**lex**	lex		te-**lxí**	l**é**xi	*lexí*

(stress is final unless otherwise marked)

10.2 Bat-El's account of basic truncation

- The colloquial imperative is subject to TRUNCATION: at least one input segment must *lack* an output correspondent
  - this is an anti-faithfulness constraint (Alderete 2001)

? See if, by adding in everyday constraints, you can predict exactly what gets kept:

ti+zkor	
tizkor	
izkor	
tzkor	
☞ zkor	
kor	

? How about /ti+kanes/ > [tkanes]?

10.3 Paradigm effects?

- ? Ideas on why the fricatives in [**f**tax], [**v**rax]? (normally, [f, v, x] are only V__, though this is complicated—see Temkin Martínez 2010)

10.4 Monosyllabic stems

- ? What do we predict so far for /ti+kax/? (It's actually [kax])

- Bat-El proposes it's because corresponding stressed syllables in the base and the derivative must be identical ("FAITH-BA-σ"):

ti+kax, cf. [tikáx]	
tikáx	
ikáx	
tkáx	
☞ káx	
áx	

- ? Any ideas for [ti-mxak] > [ti-mxak] and its ilk? What would be some good rival candidates?

- ? What we have so far makes [te-rdí] > [rédi] a problem—try making a *failed* tableau for now:

base: [te-rdí]	
terdi	
erdí	
trdí	
rdí	
☹ rédi	

- Bat-El proposes that this feminine imperative is under "paradigmatic pressure" from the masculine to exist. (Under the split-base approach, I'd maybe prefer to say that the vowel isn't truly epenthetic, since it has a correspondent in the masculine.)

There's more! See Bat-El.

To sum up

- Morphologically complex words often show phonological traces of their relatives.
- Sometimes it looks like straightforward cyclicity
- Sometimes it looks more complicated, with relationships to other relatives in the paradigm, and even to multiple members of the paradigm

Next week: phonology-syntax interface (from the phonology point of view)! Phrasal phonology

References

Albright, Adam. 2002. The identification of bases in morphological paradigms. UCLA Ph.D. dissertation.

Alderete, John D. 2001. Dominance Effects as Transderivational Anti-Faithfulness. *Phonology* 18(2). 201–253.

Benua, Laura. 1997. Transderivational Identity: Phonological Relations between Words. University of Massachusetts, Amherst.

Bowers, Dustin. 2012. Phonological restructuring in Odawa. UCLA master's thesis.

Bowers, Dustin. 2015. A system for morphophonological learning. UCLA PhD dissertation.

Brame, Michael. 1974. The cycle in phonology: Stress in Palestinian, Maltese and Spanish. *Linguistic Inquiry* 5. 39–60.

Burzio, Luigi. 1998. Multiple correspondence. *Lingua* 104(1–2). 79–109.

Chung, Sandra. 1983. Transderivational constraints in Chamorro phonology. *Language* 59. 35–66.

Crosswhite, Katherine. 1998. Segmental vs. Prosodic Correspondence in Chamorro. *Phonology* 15(3). 281–316.

Hyman, Larry M. 1994. Cyclic phonology and morphology in Cibemba. In Jennifer Cole & Charles Kisseberth (eds.), *Perspectives in Phonology*, 81–112. Stanford: CSLI Publications.

Kager, René. 1999. Surface opacity of metrical structure in Optimality Theory. In Ben Hermans & Marc van Oostendorp (eds.), *The Derivational Residue in Phonological Optimality Theory*, 207–245. Amsterdam: John Benjamins.

Kenstowicz, Michael. 1994. *Sonority-Driven Stress*.

Kraska-Szlenk, Iwona. 1995. The Phonology of Stress in Polish. University of Illinois PhD dissertation.

Rainer, Franz. 1996. Inflection inside derivation: evidence from Spanish and Portuguese. In Geert Booij & Jaap van Marle (eds.), *Yearbook of Morphology 1995*, 83–91. (Yearbook of Morphology). Springer Netherlands. http://link.springer.com/chapter/10.1007/978-94-017-3716-6_5 (12 March, 2015).

Steriade, Donca. 1999. Lexical conservatism in French adjectival liaison. In J. -Marc Authier, Barbara Bullock & Lisa Reid (eds.), *Formal Perspectives on Romance Linguistics*, 243–270. Amsterdam: John Benjamins.

Temkin Martínez, Michal. 2010. Sources of non-conformity in phonology: variation and exceptionality in Modern Hebrew spirantization. University of Southern California Ph.D. Dissertation.