Class 18: Retrospective and prospective course wrap-up

Add to your index card: Something you have *learned* at Lexical Phonology

0. Levantine Arabic stress revisited

- The puzzle: 'we understood' and 'he understood us' are both /fihim+na/
  - And yet, they are pronounced differently
  - Lexical Phonology solution: subject /-na/ and object /-na/ , which are homophonous because of their shared historical origin, are attached at different levels

/ f i h i m / 1st pl. subject	/ f i h i m / 3rd sg. masc. subj.	/ f i h i m / 3rd sg. masc. subj., 1st pl. obj.		
f i h i m + n a	f i h i m + Ø	f i h i m + Ø	*Morphology* • attach subject suffixes	"Stem" level
f i . **h í m** . n a	**f í** . h i m	**f í** . h i m	*Phonology* • stress second-to-last syll. if it has a coda or if word is only two syllables (roughly)	
- -	- -	**f í** . h i m + n a	*Morphology* • attach object suffixes • attach possessor suffixes	"Word" level
f h í m . n a	- -	- - f i . h í m . n a	*Phonology* • delete [i, u] in unstressed, coda-less syllable • re-do stress	
f h í m n a 'we understood'	f í h i m 'he understood'	f i h í m n a 'he understood us'		

(See Kiparsky 2000 for yet a third case, /fihm+na/ 'our understanding', and a post-lexical process)

To translate this into OT, we just make each "Phonology" box into a constraint ranking.
See next page.

Adding a suffix at the Stem Level

Stem level						
	'we understood' /f ihim+na/	GOOD STRESS	*COMPLEX CODA	MAX-STRESSED-V	MAX-V	NO [i][1]
-na is here, so it counts for stress	a. f í.him.na	*!				**
☞	b. f i.hím.na					**
no deletion yet at this level	c. f hím.na				*!	*
Word level—ranking changes!						
	/ f i.hím.na/	GOOD STRESS	*COMPLEX CODA	MAX-STRESSED-V	NO [i]	MAX-V
yes deletion at this level	d. f i.hím.na				**!	
☞	**e. f hím.na**				*	*
can't delete the stressed V	f. f íhm.na		*!	*	*	*

Never adding any suffix

Stem level						
	'he understood' /f ihim+Ø/	GOOD STRESS	*COMPLEX CODA	MAX-STRESSED-V	MAX-V	NO [i]
stress just the root ☞	g. **f í.him**					**
	h. f i.hím	*!				**
no deletion yet at this level	i. f hím				*!	*
Word level						
	/ **f í.him** /	GOOD STRESS	*COMPLEX CODA	MAX-STRESSED-V	NO [i]	MAX-V
yes deletion at this level ☞	**j. f í.him**				**	
	k. f íhm		*!		*	*
can't delete the stressed V	l. f hím			*!	*	*

Adding a suffix at the word level

Stem level						
	'he understood us' /f ihim+Ø/	GOOD STRESS	*COMPLEX CODA	MAX-STRESSED-V	MAX-V	NO [i]
stress just the root ☞	m. **f í.him**					**
	n. f i.hím	*!				**
no deletion yet at this level	o. f hím				*!	*
Word level						
	/ **f í.him + na** /	GOOD STRESS	*COMPLEX CODA	MAX-STRESSED-V	NO [i]	MAX-V
	p. f í.him.na	*!			**	
	q. f íhm.na		*!		*	*
shift the stress	r. f i.hím.na				**	
can't delete the stressed V	s. f hím.na			*!	*	*

[1] Kiparsky's constraint only penalizes unstressed [i], but since there's already a faithfulness constraint for stressed vowels, this seems redundant/duplicative.

Overview: Some summarizing, some stock-taking, some prospect, a little synthesis.

1. **Review through anagrams!**
   - Start by taking a couple of minutes to write down all the concepts you can remember from the second half of the course (after we finished the how-OT-works material)
     - You can look at the syllabus, but don't look at the handouts

single elf bed	
glee sniffed	
bet ensorcelled fungi	
tune log differences	
dry elicitation	
lay obligation plot	
apolitically onto	
reinitiate pivotal toy	
ropable glow	
koala hoed	
oak block	
slimier maraschino	
yam poi	
our incidental pap	
vocational piper	
pantry cranes	
coy pita	
lax lice	
extolls pica	
resurrects turnip veg	

"☼" means you're likely to learn more about the topic if you take 201A.

2. Learnability

- Review of the Chomskyan basics (one simplified view):
  - an observationally adequate grammar labels the utterances that a typical learner would encounter as grammatical (perhaps trivially, e.g. by listing them)
  - a descriptively adequate grammar captures the psychologically real generalizations—this could be operationalized as 'treats novel utterances the same way real speakers do'
  - the real prize, an explanatorily adequate theory, is a function that, given typical learning data, returns a descriptively adequate grammar

- Achieving an explanatorily adequate theory is going to have to involve ☼**learning algorithms**.
  - Interestingly, there was never a good learning algorithm to induce an ordered list of rules from surface forms, or even from underlying-surface pairs.
  - By contrast, there's a big literature on learning algorithms in OT.

- In OT, *under the assumption of a finite, universal constraint set*...
  - ...and *given input-output pairs*, it's easy
    - You do it in your head or on paper all the time
    - see Tesar & Smolensky 2000, Riggle 2004
  - ...and given inputs and just the audible portion of the outputs (no inaudible stuff like syllable boundaries): it's harder.
    - see Tesar 2000, Jarosz 2013.
  - ...and given just outputs (with or without their inaudible parts): it's a lot harder
    - see Tesar et al. 2003, Jarosz 2006, Jarosz 2015; Jarosz 2019 for an overview
    - A fair amount of phonotactic learning can be accomplished, which could later be used to learn alternations, though that second step remains largely unimplemented (see Hayes 2004, work in progress by Yang Wang & Bruce Hayes).

- There are also learning algorithms for ☼**variable/probabilistic constraint rankings**:
  - Gradual Learning Algorithm for "Stochastic OT": Boersma 1998, Boersma & Hayes 2001, Magri 2012
  - Maximum Entropy OT: Goldwater & Johnson 2003
    - For tutorial and follow-along R code, see Mayer, Tan & Zuraw 2025
  - Noisy Harmonic Grammar: Pater, Potts, & Bhatt 2007, Boersma & Pater 2008, Pater 2009
  - You can try these out (plus some non-variable algorithms) by downloading OTSoft or MaxEnt Grammar Tool from Bruce Hayes's webpage

- What if the constraint set isn't universal, and constraints have to be constructed by the learner?
  - This is still fairly uncharted territory, despite some strong early research: Heinz 2007, Hayes & Wilson 2006.

2.1 When multiple grammars are consistent with data, which one does a learner select?

- This is the "evaluation-metric" problem that we've seen since the beginning of the course—solving it is part of developing an explanatorily adequate theory.

- The **subset problem**—say you are exposed to the following (fake) language:

tagu	'goat'	tagune	'goats'	taguba	'my goat'
ale	'mango'	alene	'mangos'	aleba	'my mango'
siri	'corkscrew'	sirine	'corkscrews'	siriba	'my corkscrew'

  - ? In a rule framework, what grammar would you learn?

  - ? How do you think you would then react to the word *sirab*? Is this predicted by the grammar?

  - ? Same question for OT—what ranking would you learn for the constraints NoCoda, Max-C, and Dep-V? What does this ranking predict for *sirab*?

- Some learning algorithms have addressed this question of how a learner knows that something they've never seen is forbidden, in the absence of helpful alternations (Prince & Tesar 2004, Hayes 2004).
  - The idea is, force markedness constraints to be ranked as high as is consistent with data.

2.2 Ranking bias *within* markedness or faithfulness constraints?

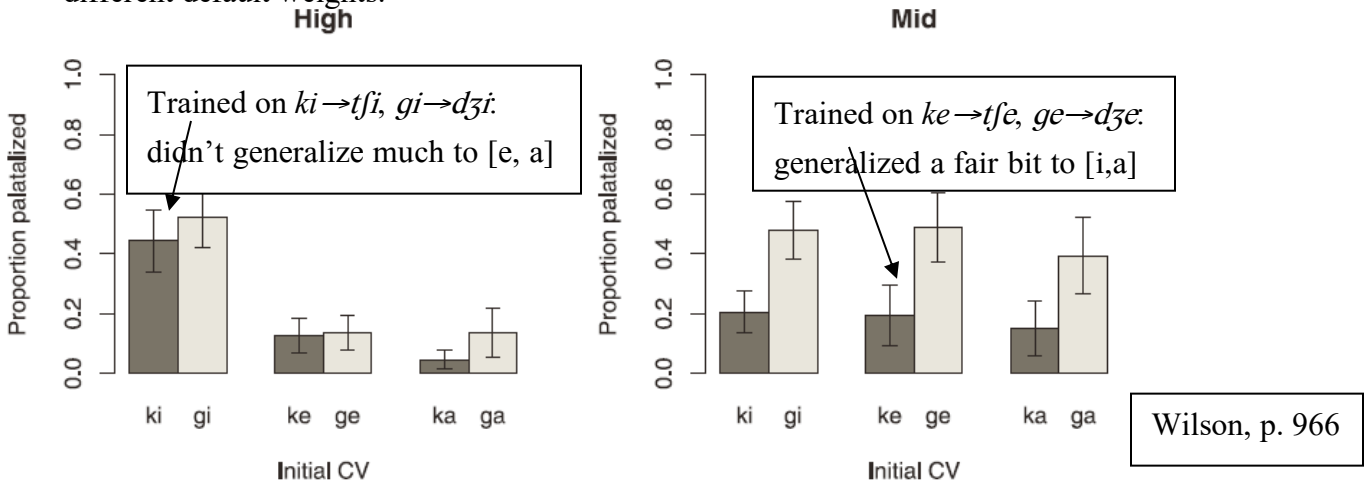
- Wilson 2006, drawing on Guion 1996: Cross-linguistically, velar palatalization (k→tʃ, g→dʒ) before one front vowel implies palatalization before a higher front vowel—that is, we see languages *ki, ke* and *tʃi, ke* and *tʃi, tʃe* but not *ki, tʃe*.

  - ? If we simply have these three constraints, what's the predicted typology: *ki, *ke, Ident(place) (I'm leaving out *ka to keep things simple)

  - One approach is to build more structure into the constraint inventory: *k[+hi], *k[–lo], Ident(place).

⁇ What typology do we get now?

- Another approach, for which see Wilson (who has experimental evidence for it):
  - In a ranking system where each constraint is associated with a weight (this is different from Classic OT's strict ranking), the learning problem involves discovering the weights.
  - We can start with each weight at zero—that is, all constraints are without effect—and promote them in response to the data.
  - Each constraint *i* is also associated with a value σ_i that determines how willing the constraint is to change its weight. (Wilson derives these from Guion's confusion rates.)
  - If we give *ke a smaller σ than *ki, then the algorithm requires more evidence in order to promote *ke than *ki.
  - So it's <u>possible</u> to learn the typologically anomalous *ki, tʃe* language, but it's a lot easier (requires less evidence) to learn the other possibilities.
  - See White 2013, Hayes & White 2015 for an approach where constraints have same σ, but different default weights.



Wilson, p. 966

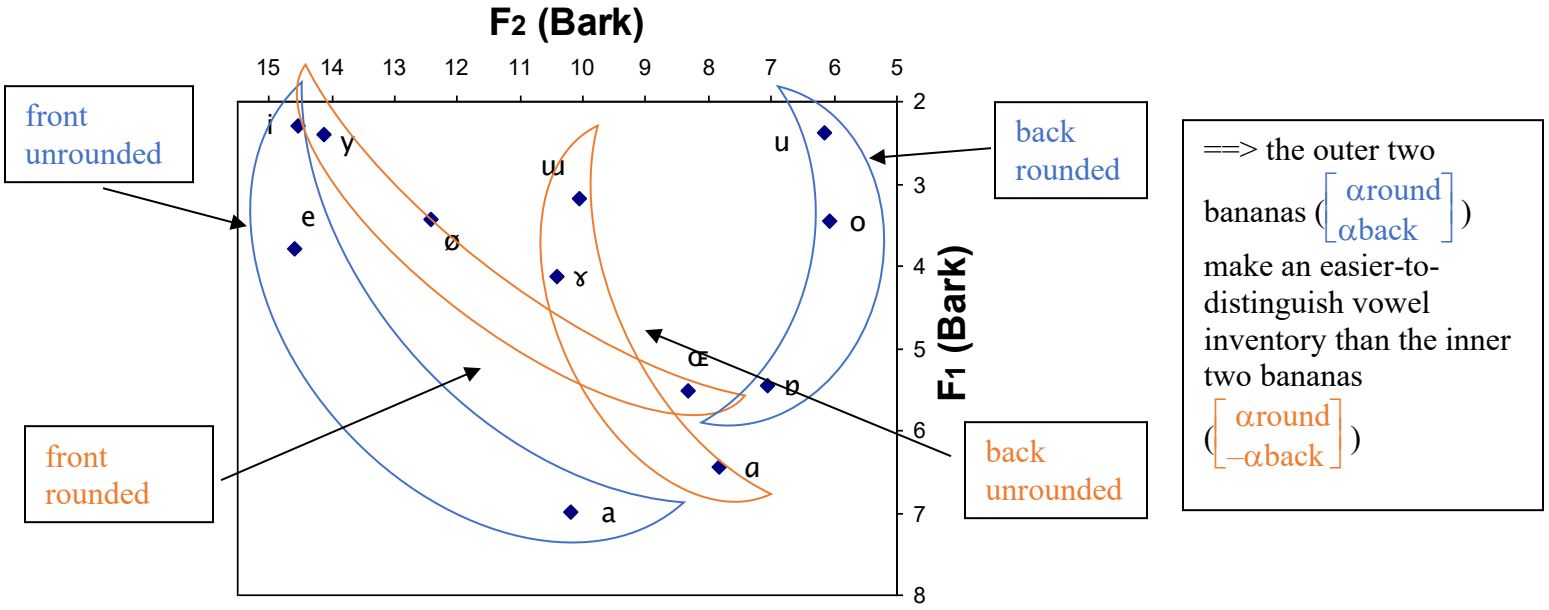
2.3 Constraint learning

- What about constraints themselves?
  - If the learner has to construct constraints, are all possibilities equally good?
  - There might be a criterion of formal simplicity (Glewwe 2019), but, as with rules, that's probably not enough.

    Compare $*\begin{bmatrix}\alpha\text{round}\\-\alpha\text{back}\end{bmatrix}$ to $*\begin{bmatrix}\alpha\text{round}\\-\alpha\text{voice}\end{bmatrix}$ –equally simple, but not equally attested
  - Same issue arises with rules: why [αround]→[αback] but not [αround]→[αvoice]?
- Along with constraint-learning itself, this is an open problem.

2.4 ☼The role of phonetics

- Well-known phonetic explanation for above round/back affinity:
  - lip rounding/protrusion and tongue backing, although articulatorily independent, share an acoustic effect (lower second formant).[2]



- Obviously phonetics explains a lot of observed phonology. But...
  - Does the explanatory mechanism lie in learner preferences (Hayes & Steriade 2004, Kawahara 2007) or in pathways of language change (Blevins 2003)?
  - Do grammars make literal reference to phonetic motivation ("don't have a contour tone if the vowel is shorter than 150 msec")
    - or do phonetic motivations get phonologized ("don't have a contour tone except in diphthongs and final syllables"), and if so how?
    - See Hayes 1999 for this question in general; Zhang 2007 for contour tones in particular.

[2] Thanks to David Deterding's Excel template (http://videoweb.nie.edu.sg/phonetic/vowels/measurements.html)

3. Process interaction: extrinsic ordering?

Feeding in Kalinga

	/sin+pajaw/	*o]$_\sigma$	MAX-V	AGREEPLACE	IDENT(place)
a	sin.pa.jaw			*!	
☞ *b*	sim.pa.jaw				*
	/d-in-opa/	*o]$_\sigma$	MAX-V	AGREEPLACE	IDENT(place)
c	di.no.pá	*!			
d	din.pá		*	*!	
☞ *e*	dim.pá		*		*

- We can't get both (b) and (d) [counterfeeding] to win, at least not with these constraints

Bleeding in English:

	/kæt+z/	OBSTRUENTSAGREEVOICE	IDENT(voice)
a	kætz	*!	
☞ *b*	kæts		*

	/bɹæntʃ+z/	OBSTRUENTSAGREEVOICE	*[+strid][+strid]	IDENT(voice)	DEP-V
c	bɹæntʃz	*!	*		
d	bɹæntʃs		*!	*	
e	bɹæntʃɪs			*!	*
☞ *f*	bɹæntʃɪz				*

- The counterbleeding candidate (e) can't win—with these constraints, it's harmonically bounded.

- Opacity is hard for standard OT to deal with, as we've seen! See McCarthy 2007b for a book-length discussion.
- You may see some ☼**proposals** in 201A for how to fix this—most of these proposals were developed for other reasons, but as a side effect predict some opacity:
  - containment (Goldrick & Smolensky 1999)
  - sympathy (McCarthy 2003)
  - candidate chains (McCarthy 2007b, Wolf 2008)
  - output-output correspondence (Crosswhite 1998; Benua 1997; Steriade 2000; Burzio 1998; Kenstowicz 1995 and others)
  - targeted constraints (Wilson 2001)
  - local constraint conjunction (Smolensky 1997, Lubowicz 2005, Kirchner 1996)
  - Stratal OT (Kiparsky 2000)
  - distantial faithfulness (Kirchner 1996)
  - *MAP constraints (Zuraw 2007, Zuraw 2013)
  - comparative markedness (McCarthy 2002)
  - harmonic serialism (McCarthy 2000, McCarthy 2010)
- Most don't capture all types of opacity, and whether all claimed types of opacity are learnable is debated in, e.g., Sanders 2002.

4. Process application

4.1 Self-feeding and self-bleeding

- Recall Takelma[3] from Anderson 1974 (maybe we skipped this one before??):
  - [a] becomes [i] if followed by [i]: /alxīx**a**m**i**s/ → [alxīx**i**m**i**s] 'one who sees us'
    - and any preceding [a]s follow suit: /ikūm**a**n**a**n**a**nink^h/ → [ikūm**i**n**i**n**i**nink^h] 'he will fix it for him' (unless a voiceless C intervenes)
    - This is expected in OT, where self-counterfeeding would be unexpected (Kaplan 2008).

- French (optional) schwa deletion from Anderson, following Dell 1973:

  ə → Ø / VC__C(r)V
  - /ty#dəvəne/ → [ty#dəvəne] or [ty#d_vəne] or [ty#dəv_ne]
  - but not *[ty#d_v_ne] 'you were becoming'
    - Again, expected in OT, where self-counterbleeding (Gikuyu??) would be unexpected.

4.2 Directional application

- If there is such a thing as directional rule application...
  - in the sense that the left/rightmost eligible site has priority for undergoing the rule, regardless of whether it's stressed/unstressed, word-initial/word-final...
    - then standard OT doesn't have much to say about it (see Hyman & VanBik 2004)

- **Hypothetical** case (pseudo-French—like real French except rule operates left-to-right):
  - *only one target*: /dəvəne/ → [dəv_ne]
  - *multiple targets:* /ty#dəvəne/ → [ty#d_vəne], *[ty#dəv_ne]
  - /...vudre#kə#sə#kə#lə#pɔlisje…/→[...vudre#k_#sə#k_#lə#pɔlisje],*[...vudre#kə#s_#kə#l_#pɔlisje]

- Eisner's (2002) directional constraint evaluation (proposed for computational reasons, not because of data like this):
  - Index a copy of *SCHWA to each position (counting by segments, though other constraints might count differently) in the output string.

[3] Language from Oregon, Penutian if you believe there is such a family. Agnes Baker Pilgrim, Siletz elder and granddaughter of Frances Johnson, who worked with Sapir to document her language www.grandmotherscouncil.org/who-we-are/grandmother-agnes-baker-pilgrim/

- Left-to-right version:

/ty#dəvəne/	*CCC	*ə-1	*ə-2	*ə-3	*ə-4	*ə-5	*ə-6	*ə-7	*ə-8
☞ *a* [ty#d_vəne]						*			
b [ty#dəv_ne]					*!				
c [ty#dəvəne]					*!		*		
d [ty#d_v_ne]	*!								

4.3 Modes of variation claimed to exist (see details and references in Class 13 handout)

- **Global**: in Warao, a word has either all [p]s or all [b]s—no mixing
- **Local**: Vaux's *[maɪkətʰəbɪlətʰi] ~ [maɪkərəbɪləri] ~ [maɪkətʰəbɪləri] ~ [maɪkərəbɪlətʰi]*
- **Iterational**: Vata */ɔ́ ká zā pī/ → ɔ́ ká zā pī ~ ɔ́ ká zā̰ pī ~ ɔ́ ká̰ zā̰ pī ~ ɔ́ ká̰ zā̰ pī*
- **At-most-one-target**: Dominican Spanish *hablar fisno* style *as.bo.ga.do ~ a.bos.ga.do ~ a.bo.gasdo ~ a.bo.ga.dos*, but **as.bo.gas.do*, (*a.bos.ga.dos*), etc.
- **At-least-one-target**: Munro & Riggle 2004
  - Akimel O'odham, aka Pima
    - closely related to Tohono O'odham
    - Uto-Aztecan language of Arizona and northwestern Mexico

Douglas Miles, founder of Apache Skateboards


Russell Moore, jazz trombonist


language specialist Annette Rave teaching at Salt River Elementary[4]

[4] www.azcentral.com/story/news/local/scottsdale-best-reads/2018/04/12/salt-river-save-its-dying-native-language-community-changing/474827002/

- Reduplication marks plurality, but in compounds plurality is expressed by reduplicating <u>any non-empty subset of the conjuncts</u>:

(5)

gloss and etymology	singular	plural forms
'bridge' (tree-road)	*'ùs-vóog*	*'ù'us-vópog, 'ù'us-vóog, 'ùs-vópog*
'church' (mass-house)	*mìish-kíi*	*mìmsh-kíik, mìmsh-kíi, mìish-kíik*
'dish' (baskety.thing-jar)	*hòas-há'a*	*hòahas-háha'a, hòahas-há'a, hòas-háha'a*
'onion soup' (onion-soup)	*sìvol-sóoba*	*sìsvol-sósba, sìsvol-sóoba, sìvol-sósba*
'peso' (Mexican-dollar)	*Jùukam-píish*	*Jùujkam-píipsh, Jùujkam-píish, Jùukam-píipsh*
'peyote' (coyote-plant.type)	*bàn-nód:adag*	*bàban-nónd:adag, bàban-nód:adag, bàn-nónd:adag*
'saltbush' (salt-grass)	*'ònk-váshai*	*'ò'onk-vápshai, 'ò'onk-váshai, 'ònk-vápshai*
'tamarack' (salt-tree)	*'ònk-'ús*	*'ò'onk-'ú'us, 'ò'onk-'ús, 'ònk-'ú'us*
'uvula' (throat-bell)	*bà'itk-kámpañ*	*bàba'itk-kákampañ, bàba'itk-kámpañ, bà'itk-kákampañ*
'wagon' (tree-car)	*'ùs-kálit*	*'ù'us-káklit, 'ù'us-kálit, 'ùs-káklit*

(3rd page of manuscript version)

5. Derivational look-ahead

- Nanti
  - Arawakan language from Peru

Lev Michael with Nanti speakers Kisimina and Behatirisa[5]

- Crowhurst & Michael 2005:
  - an iterative rule shifting stress within a "foot" (the two-syllable constituent in parentheses) can be triggered by a violation of *CLASH ("don't have two stressed syllables in a row):
    (o.kò)(ri.k**ʃì**)(**tá.**ka) → (ò.ko)(**rì**.kʃi)(**tá**.ka) 'she wore a nose-disk'
  - but stress can't shift to a less-prominent (e.g., higher) vowel:
    (i.kà)(tsi.**tò**)(**ká**.kse) 'he held (it) in his talons'
  - ? What do you think of this form? How could it be analyzed with rules? OT?
    (no.tà)(me.**sè**)(**tá**.kse) 'I scraped (it)'

[5] linguistics.berkeley.edu/~levmichael/home.html

- OT may go too far with its look-ahead ability (see Kaplan 2011 for discussion)...
  - The problematic predictions usually seem to involve two different phenomena (instead of a single phenomenon, stress, as in Nanti)
    - e.g., does any language add or subtract syllables in order to get stress onto a more-prominent vowel??
  - The problem here may be not look-ahead, but which processes can solve which kinds of problems.
  - See Blumenfeld 2006 for examples and a theory.

6. Constraint violability

- In a rules+constraints analysis of Nanti, for instance, we could have *CLASH
  - it's frequently violated, though, so we have to restrict its power, either by giving it a limited set of rules to trigger, or by stipulating that some other constraint can block its triggered rules.
- In OT, at least the theory makes it clear how this kind of interaction works:

*CLASH >> RHTYPE=IAMB...

okorikʃitaka	DON'TSTRESS LASTSYLL	PROMINENCE INFOOT	*CLASH	STRESSLAST SYLLOFFOOT
a (o.kò)(ri.kʃi)(tá.ka)			*!	*
b (o.kò)(rì.kʃi)(tá.ka)			*!	**
☞ *c* (ò.ko)(rì.kʃi)(tá.ka)				***
d (o.kò)(ri.kʃi)(ta.ká)	*!			

...but PROMINENCEINFOOT >> *CLASH

nosamerejaka	DON'TSTRESS LASTSYLL	PROMINENCE INFOOT	*CLASH	STRESSLAST SYLLOFFOOT
e (nò.sa)(mè.re)(já.ka)		*!		***
f (no.sà)(mè.re)(já.ka)			*	**!
☞ *g* (no.sà)(me.rè)(já.ka)			*	*
h (no.sà)(me.rè)(ja.ká)	*!			

7. Issues in representation

7.1 ☼Autosegmentalism

- features (especially tone) can be independent entities, not just properties of segments
- makes it easier to account for long-distance interactions (e.g., sibilant harmony: sibilants within a word must be either all alveolar, or all post-alveolar)

7.2 ☼Metrical stress theory

- Treating stress as a feature—even an autosegmental one—ccauses a lot of difficulties
- Better dealt with through grouping syllables into feet, and/or the "grid"

7.3 ☼Further hierarchical structure

- feet grouped into prosodic words, then phonological phrases, then larger intonational phrases... (e.g., Selkirk 1978; Nespor & Vogel 1986; Hayes 1989; Jun 1993).

8. The role of morphology

We looked at matters like...

- **Cyclicity**: derived words sometimes retain characteristics of their morphological predecessors
- **Non-derived environment blocking**: some processes apply only when triggered by morphology or (perhaps) other phonology
- **Levels**: within a language, subsets of the phonological processes are associated with subsets of the word-formation rules
- and relatedly, **Lexical vs. post-lexical**: there seem to be two syndromes—productive vs. not as much, gradient vs. categorical, carrying over into L2 vs. not, applying across word boundaries vs. not...

9. ☼The role of syntax—which we didn't talk about

9.1 Syntax influencing phonology

- Chimwiini, aka Bravanese
  - Variety of Swahili from Barawa, Somalia
  - Civil war has driven majority of speakers out to Kenya, UK, USA

Barawa seafront

FIGURE 5 *First page of Dada Masiti's poem 1, "After life comes death"*
SOURCE: MANUSCRIPT M.2.1.

Poem by mystic Dada Masiti (Vianello, Kapteijns & Kassim 2018)

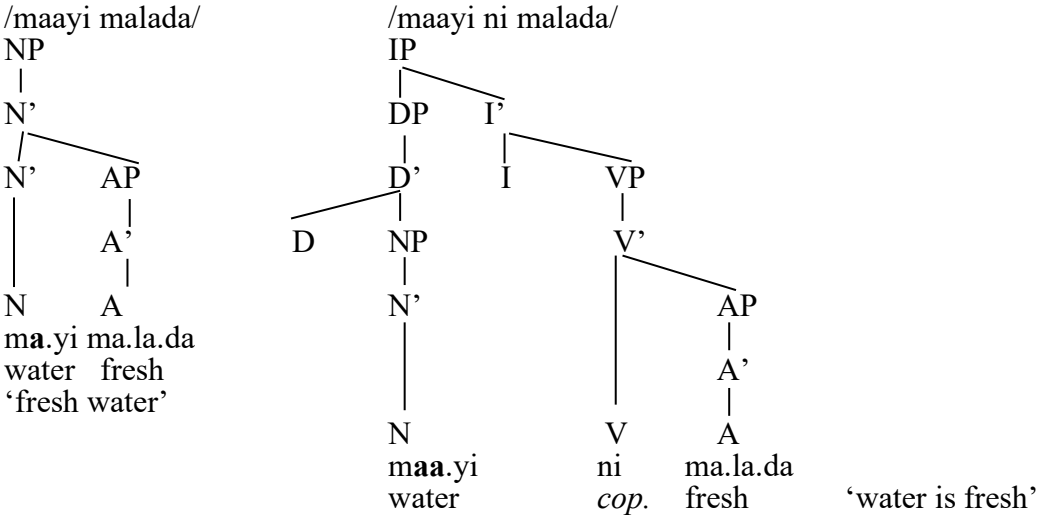
Radio Barawe, briefly banned from broadcasting in Bravanese in 2020[6]

Kisseberth 2000:

- Long vowels allowed only in the penult and antepenult of a "phonological phrase".
- Under Kisseberth's analysis, in Chimwiini the end of an XP (DP, NP, AP, VP...) ends a "phonological phrase" (but the beginning of an XP is irrelevant): ALIGN(XP,R,PPhrase,R)

[6] https://www.garoweonline.com/en/news/somalia/somalias-attempts-to-ban-radio-barawe-flop

? Why is the vowel of /maayi/ short in the first tree but long in the second?



- Most approaches to syntax's influence on phonology focus on how syntactic structure defines domains like the phonological phrase, which phonology then refers to.

9.2 Phonology influencing syntax? Or at least word order...

- Embick & Noyer 2001, Latin: the clitic *–que* 'and', attaches after 1st word of 2nd conjunct:

[bonī puerī] [bonae–**que** puellae]
good boys good–and girls 'good boys and good girls' (p. 575)

- But when the second conjunct begins with a preposition, its syllable count matters:

circum–**que** ea loca in rēbus–**que**
around-and those places in things-and

contrā–**que** lēgem dē prōvinciā–**que**
against-and law from province-and (p. 576)

- For more cases, and reviews of the literature, see Schütze 1994, Shih et al. 2015

10. Some of my favorite things to think about in phonology, besides the above

- ☼What is stored in the lexicon and what is computed online?
  - And what are the pros and cons of different methods for investigating this psycholinguistically?

- We talked in class about a possible continuum of word relationships
    - Are all of these steps different? For each step in the continuum, is there a memorized pair with shared features, and/or a morphological rule, and/or a phonological process?

obligatorily form one word from another online, applying relevant phonology	gutch → gutches
possibly form one word from another online, but it could also be stored	watch, watches
derivable but the morphology and phonology may not be so productive	opaque, opacity
irregular: morphologically related; related by rule that applies to a group of exceptions	sing, sang
suppletion-ish: morphologically related; phonologically similar but not relatable by rule	person, people
suppletion: definitely morphological related, but no phonological relationship	go, went
only semantically related	brave, courage
totally unrelated	goat, flimsy

Here is, for one child, the earliest age they demonstrated clear evidence of knowing an affix, in the sense that they applied it to a new word (they may have had the ability to do so earlier, but this provides an upper bound). Notice that the earlier the level, the later the evidence came:

morpheme type	**morpheme**	**age of first clearly productive use**	**other good examples**
Level 1 deriv.	*-ous*	4;1 (*monster-ous*, = 'having a lot of monsters')	*naturous*
Level 1 deriv.	*-al*	4;5 (*commotional*)	*congraduational*
Level 1 deriv.	*-ity*	4;5 (*lowity*)	
Level 1 deriv.	*-ment*	3;10 (*preparements*)	*longment*, *relaxment*, *distractment*
Level 1 deriv.	*-ize*	4;10 (*biggerize*)	
Level 1 irreg. infl.	irregular past	2;11 (*brang*)	
Level 1 irreg. infl.	irreg. part. *-en*	2;11 (*tooken*)	
Level 2 deriv.	*un-*	2;4 (*unmammals*) verb at 2;7 (*undigging*)	*unattach*
Level 2 deriv.	agentive *-er*	2;6 (*fall-asleep-er*)	
Level 2 deriv.	*-ness*	2;7 (*hungriness*)	*playingness*, *far-away-ness*, *smartness*
Level 2 deriv.	*-ly*	2;7 (*betterly*)	*funly*
Level 2 deriv.	comp. *-er*	2;9 (*gooder*)	*many-er* (= 'more), *importanter*, *challenger* (= 'more challenging'), dangerouser
Level 2 deriv.	*non-*	3;10 (*non-sharp*)	
Level 2 deriv.	*-est*	4;5 (*boringest*)	
Level 2 comp.	compounding	2;4 (*cardmark*)	*fruit-choosing knife*, *cheese cracker powder water*, *scooter-rided*, etc., etc.
Level ?	reduplication	3;7 (*but pretend you still don't know me know me*)	
Level ?	*-n't*	2;8 (*amn't*)	
Level ?	blends	2;11 (*talksicles are things that talk*)	*snowveralls*

Level ?	possessive *'s*	3;1 (*Who is this's?*)	
Level ?	Adj -> V *-en*	3;4 (*thinnen*)	
Level?	N -> V	2;4 (*earing* = 'carrying by the ears')	*I'm not that good at forking round things; I'll handful it*
Level?	Adj -> V	2;7 (*higher* = 'raise')	*little it up, cozying, You have to longer it; you're fasting it up*
Level 3: infl.	past *-ed*	1;10 (*gived*)	*do-ed, knowed, be-ed, keeped, go-ed, thinked*, etc., etc.
Level 3: infl.	plural *-s*	1;10 (*eyesbrows*)	*gooses, starfishes*

- ☼How detailed is a lexical representation (Bybee 2001; Pierrehumbert 2002; Gahl 2008)? Can it contain redundant information?
- What is the phonology-processing interface like?
  - How does lexical retrieval for production influence pronunciation
    - e.g. whole word vs. concatenation of morphemes (Hay 2003, but see Fiorentino 2006)
    - priming and competition from other words (Baese-Berk & Goldrick 2009 and refs. therein, Martin 2007, Smolensky, Goldrick & Mathis 2014, Zuraw et al. 2021, Breiss 2024)?
    - planning ahead (especially, into another word) to retrieve material needed for a rule's structural description (Wagner 2011; Kilbourn-Ceron & Sonderegger 2018; Kilbourn-Ceron, Wagner & Clayards 2016; Zhang 2007b; Katsuda, Repiso-Puigdelliura & Zuraw 2025)
  - How does word recognition influence perception and lexicalization?
- What are the limits of learnability? Within the learnable, are some patterns *more* learnable than others?
- How can we get good data about competence? Especially, how can we tell what's lexicon and what (if anything) is grammar?

11. Phonological things you can do after this course

- Take Ling 201A (Phonological Theory II) next quarter
  - New: there is a 2-unit option, most likely where you don't do the final project
- Check the phonology seminar (261ABC) schedule and feel free to drop in for whatever talks interest you, even if not enrolled: *linguistics.ucla.edu/events/*
  - Journal club (happens once per quarter) is a great way to find out about a lot of research in a short time
  - Going to a talk (seminar, colloquium, talk outside the department…) just because it sounds interesting can be especially helpful for keeping your motivation for schoolwork up—it tells your brain that this is something you're interested in and enjoy doing![7]
- Courses with a big phonological element that are not offered every year, so take advantage when they are:
  - Ling 205, Morphological Theory
  - Ling 202, Language Change
  - Ling 211, Intonation, an in-depth look at the higher levels of the prosodic hierarchy

[7] h/t Cal Newport's Study Hacks blog

  - Ling 217, Experimental Phonology
  - Ling 219, Phonological Theory III
  - Ling 236, Computational Phonology
- Look out for phonetics and phonology proseminars (251A/B). These are courses that focus on a special topic
- Subscribe to my Webtoon, the Comic Guide to Linguistics (just Google it on your phone)

12. How to get research ideas

- There are **templates** out there for research in linguistics.
  - When you're reading an article, think about what templates it fits into.
  - Here are some examples of more "theoretical" templates (as opposed to experimental):
    - Identifying a **phenomenon** that, if it exists, is problematic for some theory, and debating whether the phenomenon really does exist (or it can be reanalyzed, or it's not productive, etc.)
      - The WCCFL talk I was thinking of a few weeks ago: Gurevich 2000 argued that the one word of Southern Paiute that had been used by McCarthy & Prince 1995 to argue for a rule-ordering paradox (problem for SPE, justification for "reduplicative correspondence" in OT) is not actually reduplicated but rather a compound that happens to look reduplicated
        - McCarthy, Kimper & Mullin 2012 end up agreeing that all four of McCarthy & Prince's cases of "back-copying" can be dismissed, based on Gurevich's and others' re-analyses, and arguing that this is good news for Harmonic Serialism as opposed to Classic OT.
        - It might not seem like progress to go back and forth between serialism and parallelism like this, but it is progress to have a better understanding of what phenomena are actually out there
    - Apply a **new theory** or sub-theory to some data and see how it holds up
      - The Gnanadesikan 2004 article you read was like that. It was originally circulated well before 2004, in the early years of OT, and Gnanadesikan's idea was to throw a child phonology at OT and see what happened. How much would she have to stretch the theory? Would there be areas where the theory really shines?
    - Analyze **one language** in great depth, with the goal of both careful description and analysis of whatever theoretically interesting phenomena you find
      - Dissertations, like Piggott 1980, are well suited to this, since you have more time and there's no page limit.
- Some templates are better suited for a few years into your career
  - Run across some phenomenon, **have an intuition**—based on experience-fed pattern recognition—that there's something interesting about it even if you can't quite say what, and investigate more deeply
    - This is most of my papers, to be honest
  - Realize that some flaws in existing analyses, or some problems or paradoxes that are worrying people, are all related, and **propose a remedy**
    - You could say that Prince & Smolensky 1993 is an instance of this

And what about the ideas themselves?
Some say that ideas "just come". And yes, that's true. But it's true in the sense that hummingbirds "just come" to your balcony…

- How do you get hummingbirds to visit?
  - Well, you can't make them visit on demand, but you can…
    1. create and maintain the conditions that will make them visit (feeder, place to perch)
    2. be receptive to observing a visit (sit quietly on the balcony)
    3. If having a record of the visit matters, take a picture

- Getting ideas is similar
  1. Create and maintain the conditions
  - Imagine all the world's existing ideas—in art, science, literature, technology, philosophy, etc.—as a **gigantic, lumpy, porous rock**, floating in high-dimensional space
  - Surrounding the rock is a thin layer of **mist** (I picture it as green): these are the ideas that are waiting to be had, perhaps newly so. For example…
    - Apply new technology (outer edge of rock) to old research question (inside of rock), or vice versa
    - Realize that two existing ideas from different parts of the rock are in conflict
    - Realize that an existing idea makes predictions about a new data source (outer edge of rock)
  - **Know the rock**: To access the ideas waiting in that mist, you need to know one or more parts of the rock well, including the edges, and have familiarity with some other parts
    - Read articles assigned in classes
    - Read articles you need for your own research
    - Regularly check journals' new issues' tables of contents
      - at minimum read all the titles, maybe read a couple of abstracts, sometimes a whole paper
    - Go to talks in your area and outside it, including outside linguistics from time to time
    - Go to conferences
    - Take "proseminars" (special-topics courses)
    - Read review articles and books in areas outside your own (tends to be more useful than individual research articles, but you can read individual research articles too!)

  2. Be receptive
    - At least a couple of times a week, you need to spend some time (say 20 minutes at least), getting no input from the minds of others
    - Not reading, not conversing, not listening to a podcast, not playing a game
    - Walking outdoors is nice for this if possible (also does triple duty as transportation and exercise): there's something about the rhythmic movement of your limbs and the flow of visual information past you that is beneficial
    - No expectation to get ideas or solve problems *during* that time—this is just time for "pebbles" from the rock to knock into each other inside your head

3. Record (unlike the hummingbirds, you don't want the idea to come just so you can have the fleeting experience of beholding it!)

- When you have ideas, write them down somewhere so that you won't lose them and it's easy to look through them any time
  - A notebook (that is just for your ideas), a text file, Trello, whatever
  - I don't like having one notebook where you write everything including ideas and to-do lists. Your ideas get buried in there
- From time to time, go through your ideas and see if there's one you'd like to work on now

- By the time you finish your PhD, you'll always have more research ideas than you can possibly pursue—don't worry.

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