

Class 5, 10/22/20: Checking out the Rules; Pater's Analysis

1. Assignments

- Readings:
 - Moore-Cantwell, Claire (2016) The Representation of Probabilistic Phonological Patterns: Neurological, Behavioral, and Computational Evidence from the English Stress System. Read chs. 3 and 4.
 - Posted on the course website
- I will put together a stress homework for next week.

ENGLISH STRESS CONTINUED

2. Why study English stress?

- In the present case: because it is complicated!
- So much phonology teaching tends to simplify and encapsulate.
- Here, we have a little bit of time to illustrate going all-out on a hard case.

3. How many ways are there to study English stress?

- Generative phonology with analytic freedom
 - Invent an explicit procedure, of any kind we please, to predict stress.
 - *SPE* and its successors are the canonical case.
 - We might also use OT, without constraint on what sort of constraints we use.
 - These solutions are highly structured and self-consistent.
 - They can be evaluated by counting exceptions.
 - They can be evaluated by assessing the phonotactic principles that they **tacitly** enforce and seeing if these principles are true (lexically, experimentally).
- Generative phonology with restricted analytic freedom
 - Pater's classic 2000 paper is a model of this type.
 - Unpacking the predictions requires hard calculations — because of the hidden structure.
 - This modeling is very hard to do (we will see gaps even in Pater's model).
 - The hidden structure means that machine checking is also hard — the candidate set must include it.
- Descriptive work with a statistically-checked model
 - My spreadsheet about Russian final-syllable generalizations was one example.
 - (Part of) Claire Moore-Cantwell's dissertation is another.

- Such models need not be internally coherent — see Moore-Cantwell's Final [i] Constraint, which **cross-cuts** the rest of the system.
- Such models are easy to submit to statistical testing (likelihood, likelihood ratio).
- They also generate probabilities as output, which are the maximally explicit basis for experimental testing.
- They are (dangerously?) atheoretical — anything observational we want might get included.

4. What will we try to do today?

- Go through Liberman and Prince (1977), with infusions from Hayes (1982), checking out the empirical generalizations.
- Cover the rigid classic-OT analysis of Pater (2000)
- If time: discuss the issue of cyclic inheritance and variability.

5. What is forthcoming?

- Experimental checking of stress-rule productivity: Moore-Cantwell and her predecessors

MORE ON RULE-BASED ANALYSES AND THE SPECIFIC GENERALIZATIONS

6. A couple of papers that followed up on Liberman and Prince that I will refer to

- Kiparsky, Paul (1979, *LI*) "Metrical structure assignment is cyclic"
- Hayes, Bruce (1982, *LI*) "Extrametricity and English stress"

7. Here is the almost-full Liberman-Prince stress rule again

English Stress Rule, Iterative Version

$$V \rightarrow [+stress] / \text{--- } C_0 (V(C))_a (\quad V \quad C_0)_b (\quad V \quad X) \#$$

$$\langle -long \rangle_a \quad \langle -long \rangle_b \quad [+stress]$$

Conditions: $\sim a$, $\sim b$ under certain morphological and lexical circumstances.

8. Picking the "foot" that is strongest

- In rough outlines: rightmost non-final.
 - This rule was discovered in the late 1970's by Sanford Schane of UCSD

'anec,dote ,anec'dotal
'imi,tate ,imi'tation
'Hacken,sack ,Hacken'sackian

- In OT this is traditionally due to constraint ranking (☞ which?)

- Unaffixed verbs often get plain rightmost

ˌcompre'hend

ˌinter'sect

- Plus a motley crew of other environments, which we may have time to discuss later

9. Avoiding feet that are too short: “Destressing”

- The rule is complex, but in broad outlines:
- Only feet in weak position may be destressed xxx constraint
- Destressing affects light syllables almost always. xxx
- The Latinate prefixes also readily undergo: xxx
- And xxx

10. Derivation of *potato*

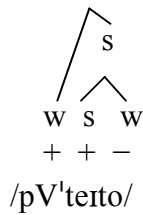
/pV'teto/

UR

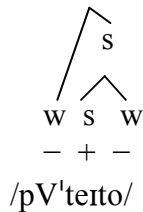
$\begin{array}{c} \diagup \quad \diagdown \\ s \quad w \\ + \quad - \end{array}$

/pV'teto/

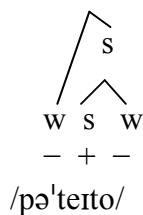
English Stress Rule Iteration I



English Stress Rule Iteration II



Destressing Rule



Vowel Reduction

- Note: we don't know the UR of the first vowel of *potato*; in parallel cases like *medicinal* we do.

11. Exercises

- Specify the outcome, including ~a or ~b as needed.

vanilla

largesse

Tatamagouchi

Epaminondas xxx IPA

12. Think about Liberman and Prince from the constraint-based perspective

- The English Stress rule establishes *maximum* distances from right word edge and between stresses.
- In more modern, structural terms, we might set up a group of constraints that define the maximal size of a metrical foot:
 - three syllables max
 - initial stress
 - no medial heavy
 - no weak long vowels

13. I wouldn't particularly mind this as a formally-defined foot

- Three is not a particularly large number.

- The medial position of a ternary foot in English is a site of severe phonetic compression, so it makes sense that it would dislike being occupied by a heavy syllable.
 - See below for evidence
- When we add in the a and b exception feature, we have something very close to a modern system:
 - phonotactics absolute: **'pæmələnə*, *ˌpæmələnə'tɛpi*, **'poudəktəl*, **'panərəud*.
 - phonotactics gradient: *antenna*, invoking the exception feature
 - the lexicon gets to have its say, within limits of the phonotactics
- So the system is in some ways well on the way to the OT system to be invented by Prince 16 years later.
- It also has the diacritic-based based system of gradient exceptions, to be introduced by Pater in 2000.

14. Evidence that the medial position of a trisyllabic foot likes to be short

- (other than that fact that it eschews heavy syllables)
- Frequent optional syncope in this position: *opera*, *family*, *camera* (work of Joan Bybee)
 - Compare: *operatic*, *germination*, *generosity*, with disyllabic foot.
 - *probably* not only undergoes Syncope but also Degemination
- I don't know the facts about characteristic duration: two random tokens I recorded:
 - *apical* [*'æpəkəl*] 38 msec.
 - *peculiar* [*pə'kjuljə*] 69 msec.

BEHAVIOR OF LONG VOWELS

15. Typology

- Careful typological studies, such as the books by Gordon (xxx) and Ryan, place CV: at the top of the heap for weight.
- The hierarchy is CV: > CVC > CVC
- English, like Cherokee (Gordon xxx) and other languages, shows the full ternary difference.
- Hence, the key constraint:

16. *FULLY STRESSLESS LONG VOWEL

- Liberman and Prince: **ponitode* [*'panɪroud*]
- The study of the stress pattern of long vowels in English is obscured by the stressless vowels [i] and [ou] that “sound like” they are long.
- Let us scrutinize them.

17. Studying the short tense vowels

- Quality: [i] and [ou]

- Distribution (claimed)
 - Final: *pity, motto*
 - Prevocalic: *courteous, meteor, poinsettia, protean; Ottawa* [ˈarou.ə],
 - Prefix-final

18. Testing with our search device

- Stressless [ou]
 - 446 total
 - 189 are final (*credo, armadillo, etc.*)
 - 31 are prevocalic (*bedouin, coagulate, coerce, coercion, coercive, coincidence, coincident, coincidental, cooperate, cooperation, coordinate, coordinate, egoism, heroin, heroine, heroism, hydroelectric, koala, noel, oasis, oboist, poetic, psychoanalysis, psychoanalysis, psychoanalyst, psychoanalytic, radioactive, retroactive, zoologist, zoology*)
 - Many are prefix-final: *pro-, proto-, psycho-, thermo-*. These must be treated as sort of like separate words.
 - Others seem to be transcription errors; more inspection needed
- Stressless [i]
 - 3600 total
 - 1800 are final
 - 830 are prevocalic
 - Others are prefixes and (probably) transcription errors.

19. Why can these tense vowels act as if they were short?

- One possibility is that they undergo Correction — V: → V / ____V
- Hayes and Moore-Cantwell (2011, *Phonology*) write:

Correction is a candidate for a natural phonological process; we have found cases of it in Latin (Mester 1994: 19), Greek (Sihler 1995: 74), Sanskrit (Kessler 1992: 28), Hungarian (Siptár & Törkenczy 2000: 125–128) and Kasem (Callow 1965: 32).

- This enables them to act like lax vowels, even though they are tense and are confusable with long vowels.


20. Following up on the prevocalic cases

- Prevocalic tense vowels not only
 - *can* count as short; but
 - *usually do* count as short (Ryan 2019, *Prosodic Weight*)
- A quick check on the database

- [i] and [ou] / ____ ə (C)]_{word}, in words of at least three syllables

[i] 430 stressless 17 stressed

[ou] 3 stressless, 9 stressed

- Stressless [i] is abundant and occurs in many suffixes ()
- It also occurs in words like *galleon*, *Israel*, *lariat*
- Here are the true cases of stressed pretonic [i]:

Common:

idea (disyllabic in rhotic dialects)

Learned:

cyclopean

eritrean

european

epicurean

jacobeian

pineal

plebeian

panacea

diarrhoea

mausoleum

museum

Foreign:

maria

pizzeria

tanzania

tortilla

eritrea

korea

- Here are the prevocalic [ou]'s, which seem too few to draw conclusions from.

Stressed: jeroboam
 protozoan
 samoa

Unstressed: bedouin
 heroin
 heroine
 Ottawa

21. The Liberman/Prince “retraction” modes: override, caused by *STRESSED PRETONIC

(II) Words in which the sequence $\check{V} \check{V}$ immediately precedes the syllable stressed by the ESR, e.g. *tórěǎdór*, *álěňáte*, *íděǎlógical*. To this class are assigned all forms with the relevant structural property, regardless of whether their morphology would normally put them in another class; so we have *météǎróid*, *météǎrite* (from the weak class), and *álěňáte*, *detériǎráte* (from the strong class).

- “Weak class” = stress immediately preceding syllable if heavy, else two to the left.
- “Strong class” = stress two to the left.
- Hayes (1982) gives some further examples

álieñáte	váriolòid	própionáte
amélioráte	méteoròid	pétioláte
detérioráte	vesúvianíte	tóreadòr
váriegáte	Ébioníte	
étioláte	méteoríte	

- He offers an abstract alternative, deriving [i] from /j/.
- He commits the standard error of the time: why does the UR have /j/ almost all the time? (the error of Ignoring the Rich Base)
- Simply adding *STRESSED PREVOCALIC to the system covers this problem.

22. Finnish alters its stress pattern in response to *STRESSED PREVOCALIC

- Ryan (2019, citing Karvonen 2008)
- Finnish has a very intricate pattern of varying binary and ternary alternation for its secondary stress pattern.
- The contrast cited by Ryan is: [ˈtanana₁rive] vs. [ˈergo₁nomia] (*[ˈergono₁mia])

23. A theory that has something at stake in preference against stressing a pretonic vowel

- Steriade’s elusive Interval Theory¹
- Discussed very thoughtfully in Kevin Ryan’s book *Prosodic Weight* (2019, pp. 153-158)
- Syllables perhaps don’t even exist.
- Stress cares about the length of the (quite salient) **interval** between the moments consonants are released into vowels.

assimilate:

ə s | ˈɪ m | ə l | eɪ t

¹ Ryan cites three unpublished mss.

deteriorate:

d i t | 'I r | i | ə r | eɪ t

- So short prevocalic vowels are rather like hyper-light syllables.

24. Do long and short [i:]/[ɪ], [o:]/[ɒ] contrast?

- *SPE* pp. 190-191 tried on the basis of the pairs (in conservative pronunciation)
 - *motto* ['marou] (cf. *ditto*, *blotto*, *auto*, *ghetto*, *libretto*, *lotto*, *motto*)
 - *veto* ['vi,t^hou] (cf. *NATO*, *Plato*, *Pluto*)
 - ☞ Looking at the examples, find a glaring weakness in this argument.
- One could try the same for the front pair:
 - *vanity* ['vænəri]
 - *manatee* ['mænə,t^hi]
 - Also, I have a difference between *creepy* and 'tee,pee, perhaps due to Zurovian Aggressive Reduplication (*Phonology* 2002)
- I'm quite skeptical, given that we now know more about the effects of word frequency in phonology.

25. Summing up the short tense vowels [ɪ] and [ou]

- They are confined to particular environments.
 - I.e. these vowels must be either stressed or in one of the privileged locations
 - else they reduce to schwa like other vowels (*photograph*)
- They probably do not contrast with long-tense counterparts, contra *SPE*
- They have special privileges of being stressless, per above,
- But beyond that they tend to actively reject being stressed.

BACK TO THE STRESS PHONOTACTICS DEFINED BY THE LIBERMAN/PRINCE ANALYSIS

26. *MAIN STRESS THREE OR MORE STRESSES FROM THE END

- **pontonmon* ['pan,tan,man]
- Exception? *Judaism* in the pronunciation ['dʒu:,deɪ,ɪzəm]
- Not in database: 'brou,ha,ha but I see this as a pseudocompound.

27. *TWO OR STRESSLESS SYLLABLES IN A ROW AT THE BEGINNING OF THE WORD

- This is implied by
 - Obligatory iteration of the rule from right to left

➤ Destressing only applies in clash.

- None at all; **petetamara* [pəɾə'tæməɾə]
- This is commonly judged to be one of the “rhythmic” principles of English stress—you have to impose alternating rhythm if there is room for it.
- This is seen in lots of languages, but is especially vivid in English where vowel reduction encodes the rhythmic pattern as lexical.

28. *THREE STRESSLESS SYLLABLES IN THE MIDDLE OF A MONOMORPHEMIC WORD

- **palemenafēptic* [ˌpæləmənə'fɛptɪk]
- Compare existing long morphemes that show proper alternating stress; Hayes (1982) located these:

Πòpocàtepétl	Òkalòacóochee	Àpalàchicóla	Àntanànarívo
Hànàmàníóa	ìpecàcuána	ònomàtopóeia	hàmamèlidánthemum

- The existing cases of triple lapse are almost all morphological inheritance effects.

ˌcapitaliˈzation from *ˈcapitaˌlize*

Similarly: *characterization, generalization, hospitalization, industrialization, internationalization, liberalization, nationalization, personalization, popularization, rationalization, heterogeneity*

Note that these words are a large exception class to the traditional “No Level 1 outside Level 2 affix.”

- Explanations again tend to be rhythm-based: you *could* put a secondary “in the middle” unless inheritance stops you.

SOME SLIGHTLY WEAKER STRESS-BASED PHONOTACTICS

29. *Three stressless syllables at the end of a word

- These are heavily tied to morphology.

30. Some apparently Level II cases that slipped through my vigilance in making the list

- tress-neutral *-ty*
admiralty, mayoralty
- *-eth*
seventieth

- -ist

colonialist, imperialist, materialist, industrialist, nationalist, traditionalist, federalist, naturalist, capitalist, secularist, caricaturist, separatist

31. -ature

caricature, temperature, literature

- OED notes an older variant with final stress on *caricature*, just like *-able*.
- Regularization fixed *FINAL, but could not restore a quality to the reduced vowel of the antepenult
- I believe that as a child I thought *caricature* was [kə'ɪkətʃə]

32. -ative

- especially when stem ends in a sonorant
 - Nanni, D. (1977) "Stressing Words in -ative," *Linguistic Inquiry* 8, 752-763.
 - Basic story: *-ative* is stressless posttonically (*contemplative, conservative, consultative*) or after a sonorant

palliative, speculative, cumulative, generative, degenerative, remunerative, operative, inoperative, recuperative, vituperative, vituperative, alliterative, figurative

- The explication of "Nanni Destressing" has been a research for some time, to which the most sensational and recent contributions have been those of Juliet Stanton (recent AMP, etc.)

33. -y, attached to /t/-final bases

celibacy, delicacy, intricacy, advocacy, candidacy, immediacy, legitimacy, illegitimacy, intimacy, obstinacy, confederacy, degeneracy, literacy, illiteracy, accuracy, inaccuracy, adequacy, inadequacy, occupancy, militancy, hesitancy, relevancy, irrelevancy, residency, presidency, expediency, incompetency, constituency, idiocy

- Perhaps a sensible thing is to adopt a strong affix-specific OO-Correspondence constraint.
- For *SPE*, this is again an underlyingly non-syllabic vowel.

34. -able is hard

... and may respond to a variety of tricks

35. Plausible Level II cases

serviceable, knowledgeable, perishable, enviable, variable, invariable, fashionable, impressionable, fissionable, actionable, objectionable, questionable, reasonable,

seasonable, personable, considerable, imponderable, insufferable, pleasurable, comfortable (note the intriguing metathetic variant ['kʌmfɪəbəl]),

36. *-able* attached to bound stems

applicable, inapplicable, amicable, communicable, inextricable, practicable, impracticable, irrevocable, formidable, malleable, permeable, indefatigable, navigable, irremediable, amiable, inviolable, incalculable, estimable, inalienable, interminable, inseparable, tolerable, intolerable, innumerable, venerable, vulnerable, invulnerable, operable, inoperable, miserable, memorable, inexorable, impenetrable, habitable, imitable, inimitable, indomitable, inhospitable, charitable, veritable, irritable, equitable, inequitable, inevitable, attributable, reputable, eligible, ineligible, negligible, intelligible, incorrigible

37. *-able* attached to bound stems: a corner of the lexicon where the inheritance principle is strikingly weak

irreparable, comparable, incomparable, preferable, admirable, demonstrable

38. *-able* seems to be a tough nut analytically

- Obviously, we can't always appeal to Level II status.
- If you like playing with abstract underlying forms, you can go with the classical /-VbI/. (per Liberman and Prince, SPE p. 160)
 - It is *not* a particularly persuasive UR, since you have to get the [i] in the derived form *Xability* (SPE adopts /ɪ/ Epenthesis, seen also in *nobility*).
- One other move that seems plausible to me is to derive *-able* adjectives from *-ate* verbs, with affix-specific OO-correspondence. This works for

*applicable, inapplicable, amicable, **communicable, inextricable**, practicable, impracticable, irrevocable, formidable, malleable, **permeable**, indefatigable, **navigable, irremediable, amiable, inviolable, incalculable, estimable, inalienable, interminable, inseparable, tolerable, intolerable, innumerable, venerable, vulnerable, invulnerable, operable, inoperable, miserable, memorable, inexorable, **impenetrable**, habitable, **imitable, inimitable**, indomitable, inhospitable, charitable, veritable, **irritable**, equitable, inequitable, inevitable, attributable, reputable, eligible, ineligible, negligible, intelligible, incorrigible***

but this leaves quite a few behind.

EXCURSUS: THE UNDERLYING-NONSYLLABIC HYPOTHESIS FOR ABERRANT STRESS PATTERNS

39. Origin

- SPE, adopted as well in Liberman and Prince (1977)
- A classic of 60's phonology, since in most cases it is an absolute neutralization

40. Idea

In final position, following a consonant, we have extensive vocalization:

<i>Underlying</i>	<i>Surface</i>	<i>In the context</i>
/j/	[i]	/ C ____] _{word}
/ɪ/	[ɪ] = [ɔ̃], [əɪ]	
/I/	[I] ~ [əI]	
/m/	[m] ~ [əm]	

41. Sample derivations

<i>Aristotle</i>	<i>colander</i>	<i>inimitable</i>	<i>cf. Alexander</i>	
/æ.ɪs.tatɪ/	/kəlVndɪ/	/ɪnɪmɪtVbɪ/	/æɪVgzændVɪ/	underlying forms
æ.ɪs'tatɪ	—	—	—	certain final clusters attract stress (later)
'æ.ɪs'tatɪ	'kəlVndɪ	ɪn'ɪmɪtVbɪ	'æɪVg'zændVɪ	core stress rules
'æ.ɪs,tatɪ	—	—	æɪVg'zændVɪ	main is rightmost nonfinal
'æ.ɪs,tatəl	'kəlVndəɪ	ɪn'ɪmɪtVbəl	—	vocalization
—	'kələndəɪ	ɪn'ɪmɪtəbəl	æɪləg'zændəɪ	vowel reduction
['æ.ɪs'tatəl]	['kələndəɪ]	[ɪn'ɪmɪtəbəl]	[æɪləg'zændəɪ]	surface forms

42. A nice aspect of this story

- What holds for [i], [I], [ɪ], [m] does *not* hold for [ə]
- So we're doing great for *['æ.ɪs'tatəl], *['kələndəɪ], *['ɪn'ɪmɪtəbəl]
- Not perfectly, since we do have 'ruta,baga.

43. But is this perhaps sort of fishy?

- There was no Rich Base principle guiding researcher at the time of SPE or Liberman/Prince.
- Rich Base I: different underlying consonants are available for the three different cases
 - *Aristotle* cases: /j/, /m/, /ɪ/, /I/ (*Abernathy*, *protoplasm*, *Lysander*, *axolotl*)
 - *colander* cases: no /m/ or /I/ (is Cm, Cl stress-attracting?)²
 - *inimitable* cases: /I/, /j/, no /ɪ/ or /m/ (*in'imitaber*, *inimitasm*)
- Rich base II: what if funny clusters occurred elsewhere? /pɛpjt.ɪklmj/ → [ʔ ɸ]

² When I put forth **'podectal* as an illustration of the heavy penult restriction, Michael suggested that *'podecter* might not be as bad, and I tend to agree.

- Rich base III: what happens to /kɑɪpntə/?
- Rich base IV: /w/ is missing. *¹Aris₁totu, *¹colandu, *in¹imitabu (or perhaps [ou])

44. Is there a nonabstract alternative?

- Surely there is, but its hard to do with typologically natural constraints: why should skipability of a heavy penult depend on [ɪ] vs. [ɪ̥]?

45. A diachronic explanation for the anomaly in *-able*

- Inspection of the verse of John Milton (1608-1674) shows a poetic license:

i, ou, ə̃ → j, w, ɪ / $\left[\begin{array}{c} \text{V} \\ \text{---} \\ \text{---stress} \end{array} \right]$

As in

O Myriads of immortal Spirits, O Powers
Sublim'd with Mineral fury, aid the Winds,
Not by the sufferance of supernal Power.

This never applies pretonically:

BRIARIOS or TYPHON, whom the Den

And it never applies before *-able*:

To make her amiable: On she came,
Innumerable force of Spirits arm'd
All on a sudden miserable pain

- So I think Milton said [-ɛɪbəl] or [-æbəl] or [-ɒbəl]
- Thus, in Milton's time, *-able* was weird for its *main* stress placement, but not so weird for the ability to place stress far to the left — lapse was shorter by one syllable.
- And weird main stress placement for words ending in [əl] is reasonably well attested.

hospital, participle, pumpernickel, tabernacle, Aristotle, axolotl

46. *-ature*

caricature, temperature, literature

- OED notes an older variant with final stress on *caricature*, just like *-able*.
- Regularization fixed *FINAL, but could not restore a quality to the reduced vowel of the antepenult
- I believe that as a child I thought *caricature* was [kə'ɪkətʃə]

47. -ative

- especially when stem ends in a sonorant
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palliative, speculative, cumulative, generative, degenerative, remunerative, operative, inoperative, recuperative, vituperative, vituperative, alliterative, figurative

- The explication of “Nanni Destressing” has been a research for some time, to which the most sensational and recent contributions have been those of Juliet Stanton (recent AMP, etc.)

48. -y, attached to /t/-final bases

celibacy, delicacy, intricacy, advocacy, candidacy, immediacy, legitimacy, illegitimacy, intimacy, obstinacy, confederacy, degeneracy, literacy, illiteracy, accuracy, inaccuracy, adequacy, inadequacy, occupancy, militancy, hesitancy, relevancy, irrelevancy, residency, presidency, expediency, incompetency, constituency, idiocy

- Perhaps a sensible thing is to adopt a strong affix-specific OO-Correspondence constraint.
- For *SPE*, this is again an underlyingly non-syllabic vowel.

49. Another absolute of the system

- Application of the English Stress Rule is obligatory — diacritics can repress a parenthesize element, but they cannot turn it off.
- Hence, forms like *[pətə'tæmə.ɹə] are totally illegal; and indeed they are totally absent.

50. Feet with medial heavy syllables

- Here is what my little program dredged up; there are others.

		Coda	Final vowel
character	K EH1 R IH0 K T ER0	K	ER0
galaxy	G AE1 L AH0 K S IY0	K	IY0
realtor	R IY1 AH0 L T ER0	L	ER0
cavalry	K AE1 V AH0 L R IY0	L	IY0
chivalry	SH IH1 V AH0 L R IY0	L	IY0
fealty	F IY1 AH0 L T IY0	L	IY0
penalty	P EH1 N AH0 L T IY0	L	IY0
columnist	K AA1 L AH0 M N AH0 S T	M	
calumny	K AE1 L AH0 M N IY0	M	IY0
parentage	P EH1 R AH0 N T AH0 JH	N	

calendar	K AE1 L AH0 N D ER0	N	ER0
colander	K AA1 L AH0 N D ER0	N	ER0
lavender	L AE1 V AH0 N D ER0	N	ER0
cylinder	S IH1 L AH0 N D ER0	N	ER0
passenger	P AE1 S AH0 N JH ER0	N	ER0
messenger	M EH1 S AH0 N JH ER0	N	ER0
scavenger	S K AE1 V AH0 N JH ER0	N	ER0
harbinger	HH AA1 R B IH0 N JH ER0	N	ER0
carpenter	K AA1 R P AH0 N T ER0	N	ER0
scientist	S AY1 AH0 N T IH0 S T	N	IY0
warranty	W AO1 R AH0 N T IY0	N	IY0
howitzer	HH AW1 AH0 T S ER0	T	ER0

51. Comments on these

- All end in a “suspect” vowel, derived in *SPE* from an underlying nonsyllabic source.
- The medial codas tend to be sonorants — which will pop up soon, as the basis for words like *Hackensack*, (with final secondary stress, per Ross) where it is actually the *norm* to skip across a heavy penult (Hayes 1982)

Hóttentòt	Jáckendòff	dávenpòrt	Áppelbàum
bálderdash	ámpersànd	cávalcade	pálinldròme
Háckensàck	Árkansàs	mérchandise	mísanthròpe
Álgernòn	máckintòsh	Áberdèen	níghtingàle

- The final vowel is often [i]; and these forms form part of the evidence for the Moore-Cantwellian Final [i] Constraint.

52. What have we got?

- Scrutinized versions of:
 - Don't not stress long vowels.
 - Don't skip three lights at the end, or medially
 - Don't begin with two stressless
 - Don't put a heavy syllable in the middle of a trisyllabic foot

53. To come

- There are still some generalizations to be checked about the choice of which stress will be the main stress.
- Also, about where stress *cannot* occur; the Destressing principles.

- Morphology and retraction
- Cyclicity
- “Superimposed” constraints (Moore-Cantwell)

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54. Reference

- (readings:) Joe Pater (2000) Non-uniformity in English secondary stress : the role of ranked and lexically specific constraints. *Phonology* 17:237-274.
- This is one of the most detailed modern analyses of English stress
- Oddly, the analysis is just a setup for the real items on Pater’s agenda:
 - morphological inheritance
 - lexical exceptionality
 which we will take on next time

55. Our particular interest here

- This dates from a classical era whose research goals strongly emphasized:
 - Finding tight-yet-adequate universal constraint sets
 - Finding a very tight version of metrical stress theory

56. Pater’s constraints for basic word stress

- “Basic” = we haven’t done inheritance effects yet.
- I’m impressed with their simplicity and naturalness.
- Thus, a lot of work comes from the ranking, which is intricate.

FTBIN	No monomoraic feet (we need to discuss the few exceptions)
TROCH	Feet must have falling prominence (inviolable)
*SONNUC	Avoid syllabic sonorants like [ŋ, l, ɹ]
*OBSNUC	Avoid syllabic obstruents (inviolable)
NON-FIN	Don’t foot the last syllable
ALIGN-HEAD	Penalize the main stress for every syllable separating it from right edge
PARSE σ	Penalize unfooted syllables
WEIGHT TO STRESS	Penalize unstressed heavy syllables
*CLASH-HEAD	Don’t be stressed next to the main stress
ALIGN-L	Penalize every time any syllable precedes any foot

57. Two constraints that go beyond the finite-state

ALIGN-L	Penalize every sequence $\sigma \dots$ foot
ALIGN-HEAD	Penalize the main stress for every syllable separating it from right edge

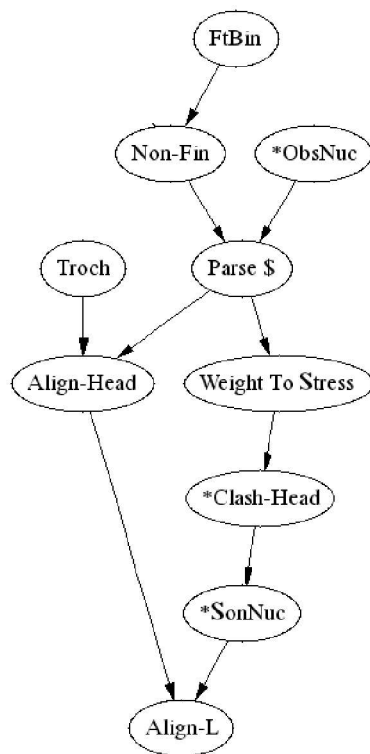
- McCarthy (2004, *Phonology*) argues we can do without them; but I'm not sure what we'd say for English.
- Constraints like ALIGN-L (count each intervenor for each target) have dreadful computational consequences, since you can't evaluate them with finite state machines.

58. Checking out Pater

- I entered violations into OTSoft and tried to find cases where the analysis wouldn't work.
- I have found this useful in reviewing journal article submissions ...

59. Overall ranking

- Obtain with the Fusional Reduction Algorithm of Brasoveanu and Prince, in the OTSoft implementation.
- The diagram has an impressive "ranking depth" of seven. And none of the constraints is vacuous (analysis would work without it).



60. How to get the Latin Stress Rule pattern for English

- Main stress would like to be as far to the right as possible (Align-Head)
- But it's bad to foot the final syllable (Non-Fin)
- And it's bad to have a monomoraic foot (FtBin)

/horizon/	ALIGN-L	*SONNuc	*CLASH-HEAD	WEIGHT TO STRESS	ALIGN-HEAD	PARSE \$	NON-FIN	*OBSNuc	TROCH	FTBIN
☞ ho[1ri]zon	*				*	*				
[1hori]zon					*!	*				
[2hori][1zon]	**						*!			

/Canada/	ALIGN-L	*SONNuc	*CLASH-HEAD	WEIGHT TO STRESS	ALIGN-HEAD	PARSE \$	NON-FIN	*OBSNuc	TROCH	FTBIN
☞ [1Cana]da					**	*				
Ca[1nada]	*				*	*	*!			
[Ca1na]da					*	*			*!	
Ca[1na]da	*				*	**				*!

61. Exercise

Let us work out *emphasis*.

62. English is an alternating stress language

(though sparsity of long words without inheritance effects makes this hard to prove)

/Apalachicola:/	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2Apa][2lachi][1co]la					*	*				*****
A[2pali]chi[1co]la					*!*	*				****
[2Apa]lachi[1co]la					*!*	*				****
[2Apa][2lachi][1cola]				*!		*				*****

- Why? because PARSE σ outranks ALIGN-L, to be covered below.

63. English has the “Initial Dactyl Effect”

- What looks like alternating R-L stress actually gets initial stress in 5-syllable words:
Tatama'gouchi
- Mentioned earlier as the default, overridden by inheritance in *as_isimi'lation*

/Tatamagouchi/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2Tata]ma[1gou]chi					**	*				***
Ta[2tama][1gou]chi					**	*				***!
[2Tata][2ma][1gou]chi	*!				*	*		*		*****

- Why? because ALIGN-L, way at the bottom, dictates which syllables get footed in the left region.

64. The intuitive wisdom of the pioneers

- The long place names that illustrate alternating stress and the initial dactyl effect in the pure forms are known collectively to no one.³
- Yet they are stressed rather consistently—an acquisition puzzle; why were the pioneers who loan-adapted these words all wise *in the same way*?
- The two effects are commonly found in languages (Hayes 1985, *BLS*)

65. Medial CVC syllables: the intricate pattern

	In single clash	In double clash	In Arab context
Closed by sonorant	usually stressed: <i>Franc<u>is</u>co</i> , <i>Halicar<u>n</u>assus</i>	usually not stressed: <i>San Fran<u>c</u>isco</i>	not stressed: <i>ser<u>e</u>ndipity</i>
Closed by obstruent	usually stressed: <i>tec<u>t</u>onic</i>	stressed: <i>Tim<u>b</u>uctoo</i>	not stressed: <i>Alex<u>a</u>nder⁴</i>

- These are Pater's claims about what is normal.
- I would need fancier software to check them thoroughly.
- Deviations from the *Francisco* pattern: about 270 words with *con-*, *com-*
- Deviations from the *tectonic* pattern: many words with *ex-*, *sub-* and *Mc-*.
- Deviations from the *Alexander* pattern: only two, *ˌaf.fec'tation*, *ˌan.nex'ation* (significantly, with the low vowel /æ/, which best tolerates subminimal footing)

66. How Pater gets the pattern: obstruent-closed syllables

Alexander: only Ft-Bin can force a violation of Weight-To-Stress:

³ Except me, who spent many hours of grad school combing through *Webster's Geographical Dictionary*.

⁴ Also: *inadmissible inexplicable charismatic designation inadvertence jurisdiction recognition resignation satisfaction*

/Alexander/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2Alex][1an]der						*	*			**
A[2lex][1an]der					*!	*		*		***
[2Alx][1an]der			*!		*	*				**
[A2lex][1an]der		*!			*	*		*		**
[2A][2lex][1an]der	*!				*	*		*		***

Timbuctoo, tectonic: otherwise, you have to stress an obstruent-closed syllable, despite the clash.

/Timbuctoo/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2Tim][2buc][1too]				*				*		***
[2Timbuc][1too]				*			*!			**
[2Tim]buc[1too]				*	*!		*			**
[2TimbC][1too]			*!	*						**

/tectonic/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2tec][1tonic]				*		*		*		*
tec[1tonic]				*	*!	*	*			*
tC[1tonic]			*!	*	*	*				*

67. How Pater gets the pattern: sonorant-closed syllables

- Novel move: take seriously the fact that sonorant-closed syllables surface as syllabic sonorants (or at least, darn close), and consider them to be light.
- This opens up candidates not available when the coda consonant is a sonorant.
- *fran* can be the weak syllable of a foot in *San Francisco*, and seeks this refuge.
- It would be unparsed in *Francisco*, and instead just attracts stress.

/Francisco/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2Fran][1cis]co					*	*		*		*
[1Francis]co					*	***!	*			
FrN[1cis]co					***!	*			*	
Fran[1cis]co					***!	*	*			*
[1FrancS]co			*!		*	**				

/San Francisco/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse \$	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2Sanfrn][1cis]co					*	*			*	**
[2San][2fFran][1cis]co					*	*		*!		***
[2Sanfran][1cis]co					*	*	*!			**

- Crucial loser is FrN[1cisco] — unparsed syllable.
- What is especially nice about this is that it removes English as a counterexample to the general principal that sonorant-closed syllables tend to be either heavier or equally heavy with obstruent-closed syllables.

68. A missing constraint

- There must be no ternary feet, else the following wrong candidate would win:

/Halicarnassus/:	FtBin	Troch	*ObsNuc	Non-Fin	Parse S	Align-Head	Weight To Stress	*Clash-Head	*SonNuc	Align-L
☞ [2HalicR][1nassus]				*		*			*	***
[2Hali][2car][1nassus]				*		*		*!		*****

69. Another gap?

Let's try Luxipallilla, which Pater mentions in a footnote as problematic.