

Classes 9 & 10: Issues in process application: multiple targets, directionality, iterativity, multi-site variation

To do

- I'll post a homework on this week's material Thursday, due the following Friday (Feb. 13)
- Sanders study questions due Tues., Feb. 10
- By the end of this week, you should have talked to me once about your paper topic. It doesn't have to be a long talk. Why not come to my office hours tomorrow?

First, a little on Richness of the Base

0.1 Phonemes in OT?

- In most versions of rule-based phonology, to describe a language you need...
 - a phoneme inventory
 - a lexicon
 - (maybe morpheme structure constraints)
 - an ordered list of rules
- In OT, all you have is
 - a lexicon
 - a ranked list of constraints.
- So how can we account for which sounds do and don't contrast, without stating the phoneme inventory?

Simplified English

- Construct a grammar to explain which stops are aspirated (don't worry about explaining why [ɾ] instead of [t])

| | | |
|-----|---|--|
| | /poteto/ | |
| ☞ a | p ^h ə't ^h eɪrou | |
| b | p ^h ə't ^h eɪt ^h ou | |
| c | p ^h ə'reɪrou | |
| d | pə't ^h eɪrou | |

- Now, see if you can tweak your grammar so you still get the right result if the input is different

| | | |
|-----|---|--|
| | /p ^h otet ^h o/ | |
| ☞ a | p ^h ə't ^h eɪrou | |
| b | p ^h ə't ^h eɪt ^h ou | |
| c | p ^h ə'reɪrou | |
| d | pə't ^h eɪrou | |

- Moral: [C] and [C^h] don't contrast in English, because the constraint ranking does not allow minimal pairs to exist on the surface.
 - Even if the lexicon contained both /pat/ and /p^hat/, there would not be a surface minimal pair *[pat] and [p^hat].
- More generally, sounds contrast in OT if (and where) the grammar allows them to

0.2 More broadly, no constraints on underlying forms

- A phoneme inventory is in a way a set of constraints on underlying forms
 - “No underlying clicks”, “No underlying aspirated stops”
- In standard OT, there are no constraints on underlying forms, in the form of a phoneme inventory or otherwise
 - markedness constraints: regulate surface/output forms
 - correspondence/faithfulness constraints: require similarity of underlying/input and surface/output
 - but no constraints on just the underlying/input form
- That is, nowhere in the grammar is there anything that regulates underlying forms.
 - **It's up to the grammar to make sure that every conceivable underlying form** (even if it's not an *actual* underlying form) **gets turned into a legal output form**.
- This idea that the set of potential underlying forms is unconstrained (and therefore the same in every language!) is known as ‘Richness of the Base’ (Prince & Smolensky, 2004)
 - where *Richness* = *Unconstrainedness* and *Base* = *Set of underlying forms*.

0.3 FAQ about Richness of the Base

Q Does that mean the lexical entry for English *upper* is /ʌp^hə/? Why would the language-learning child think that?

A No, the lexical entry for *upper* is presumably just /ʌpə/

- We can assume that, in the absence of alternations, the child posits inputs that are identical to the outputs she/he hears (Prince & Smolensky's “Lexicon Optimization”).
- The point is that it's up to the grammar to explain why, if there *were* an underlying form like /ʌp^hə/, it *couldn't* get pronounced faithfully, as *[ʌp^hə].

Q When should I show a tableau for one of these implausible inputs?

A If you're analyzing an alternation, it's usually not necessary.

- But if you're trying to explain something about legal vs. illegal morphemes, you may need to show that a “bad” underlying form gets changed by the grammar.

Q How do I know what a “bad” input turns into?

A In many cases, you don't know.

- For example, English speakers agree that *[ɲip] is bad, but what should /ɲip/ turn into?
- Sometimes people draw on evidence from how loanwords are adapted
 - but as you saw last week, this is dicey to interpret
- Sometimes the constraint ranking you have already forces you to one choice
- In other cases, you can only show that the faithful output candidate doesn't win; you can't determine what the winner is.

Overview of our main topic: Multiple application

- The basic problem to be dealt with this week is what to do with a form that, for some rule $A \rightarrow B / X_Y$ or constraint $*XAY$, contains multiple instances of XAY , either because XAY straightforwardly occurs twice in the form, or because there are multiple ways of interpreting XAY (in a rule schema).
- And, what if applying the rule, or satisfying the constraint, creates or destroys instances of XAY ?

There's a whole can of worms here that's only barely been re-opened in the OT era.

Great sources for term-paper topics, which I also relied on to get many of this handout's examples: Howard 1972, Johnson 1970, and Anderson 1974 (which you read a chapter from). I'd stay away from the stress cases, though, since their rule-application issues tend to go away under metrical stress theory.

1. Multiple matches: a simple case

- SPE p. 344: "To apply a rule, the entire string is first scanned for segments that satisfy the environmental constraints of the rule. After all such segments have been identified in the string, the changes required by the rule are applied simultaneously."

Example: Palauan vowel reduction (Austronesian language from Republic of Palau with about 25,000 speakers. Data from Josephs 1990.)

| <i>X</i> | <i>his/her/its X</i> | |
|----------|----------------------|-------------|
| rákt | rəkt-él | 'sickness' |
| sésəb | səsəb-él | 'fire' |
| bótk | bətk-él | 'operation' |
| ríŋəl | rəŋəl-él | 'pain' |

- How would your rules from the last assignment apply to an underlying representation like /ðiloba? + eli/ 'his injury'? (real outcome is [ðələbə?él])

- Let's sketch an OT analysis—any problems?

2. Klamath (self-bleeding)

(Penutian language of Oregon, very endangered. Data and description taken from Kisseberth 1972; originally from Barker 1963, which I have not consulted)

glottalized stops: $\overset{\text{̣}}{p}$ $\overset{\text{̣}}{t}$ $\overset{\text{̣}}{c}$ $\overset{\text{̣}}{k}$ $\overset{\text{̣}}{q}$
 glottalized sonorants: $\overset{\text{̣}}{m}$ $\overset{\text{̣}}{n}$ $\overset{\text{̣}}{y}$ $\overset{\text{̣}}{w}$ $\overset{\text{̣}}{l}$
 regular sonorants: m n w y l
 voiceless sonorants: M N W Y L

Deglottalization rules, informally:

glottalized stop → deglottalized / __C-other-than {m,n,w,y,l}
 other glottalized → deglottalized / __C

| | | | | |
|--|--|-------------------|---|--------------------------------|
| $\overset{\text{̣}}{q} \rightarrow q$ / $_ \overset{\text{̣}}{n}$ | $n\overset{\text{̣}}{c}o\overset{\text{̣}}{q}$ -a | ‘is deaf’ | $n\overset{\text{̣}}{c}o\overset{\text{̣}}{q}$ - $\overset{\text{̣}}{n}$ apg-a | ‘is almost deaf’ |
| $\overset{\text{̣}}{p} \rightarrow p$ / $_ \overset{\text{̣}}{t}$ | $\overset{\text{̣}}{p}\overset{\text{̣}}{e}t$ -a | ‘a hole enlarges’ | $\overset{\text{̣}}{p}\overset{\text{̣}}{e}$ - $\overset{\text{̣}}{p}t$ -a | ‘dist. holes tear out’ |
| $\overset{\text{̣}}{t} \rightarrow t$ / $_ \overset{\text{̣}}{k}$ | m - $\overset{\text{̣}}{p}\overset{\text{̣}}{e}t$ -a | ‘enlarges hole’ | m - $\overset{\text{̣}}{p}\overset{\text{̣}}{e}t$ - $\overset{\text{̣}}{k}y$ -o:l-a | ‘chips open a hole’ |
| $\overset{\text{̣}}{q} \rightarrow q$ / $_ \overset{\text{̣}}{c}$ | $\overset{\text{̣}}{q}o\overset{\text{̣}}{c}$ -a | ‘bends’ | $\overset{\text{̣}}{q}o$ - $\overset{\text{̣}}{q}\overset{\text{̣}}{c}$ -a | ‘dist. bend’ |
| $\overset{\text{̣}}{p} \rightarrow p$ / $_ W$ | $n\overset{\text{̣}}{t}o\overset{\text{̣}}{p}$ -a | ‘rots, spoils’ | $n\overset{\text{̣}}{t}o\overset{\text{̣}}{p}$ - Wi :y-a | ‘almost rotted’ |
| $\overset{\text{̣}}{p} \rightarrow p$ / $_ y$ | | | $n\overset{\text{̣}}{t}o\overset{\text{̣}}{p}$ - ye :g-a | ‘starts to spoil’ |
| $\overset{\text{̣}}{t} \rightarrow t$ / $_ w$ | | | $w\overset{\text{̣}}{L}e\overset{\text{̣}}{t}$ -wal | ‘lies spread eagled on top of’ |
| | cf. | | $w\overset{\text{̣}}{L}e\overset{\text{̣}}{t}$ -pga | ‘is lying flat on back’ |
| $\overset{\text{̣}}{n} \rightarrow n$ / $_ \overset{\text{̣}}{k}$ | $\overset{\text{̣}}{n}o$ - $\overset{\text{̣}}{k}a$ | ‘little head’ | $\overset{\text{̣}}{n}o$ - $\overset{\text{̣}}{n}$ - $\overset{\text{̣}}{k}a$ | ‘dist. little heads’ |
| $\overset{\text{̣}}{w} \rightarrow w$ / $_ \overset{\text{̣}}{c}$ | $\overset{\text{̣}}{w}i\overset{\text{̣}}{c}$ -a | ‘is breathless’ | wi - $\overset{\text{̣}}{w}\overset{\text{̣}}{c}$ -a | ‘dist. are breathless’ |
| $\overset{\text{̣}}{y} \rightarrow y$ / $_ G^1$ | $\overset{\text{̣}}{?}$ - $iw\overset{\text{̣}}{y}aq$ | ‘put in pl. obj.’ | $\overset{\text{̣}}{?}i$ - $\overset{\text{̣}}{?}o$: $\overset{\text{̣}}{y}Ga$ | ‘dist. put pl. obj. into’ |
| $\overset{\text{̣}}{l} \rightarrow l$ / $_ \overset{\text{̣}}{l}$ | k - $\overset{\text{̣}}{b}o\overset{\text{̣}}{l}$ -a | ‘hits in stomach’ | w - $\overset{\text{̣}}{b}o\overset{\text{̣}}{l}$ - $\overset{\text{̣}}{l}G$ -a | ‘falls on stomach’ |
| $\overset{\text{̣}}{w} \rightarrow w$ / $_ \overset{\text{̣}}{l}$ | $ga\overset{\text{̣}}{w}al$ | ‘finds’ | $ga\overset{\text{̣}}{w}l$ - i :ya | ‘finds for someone’ |

○ Can we collapse this into a single rule schema (we can cheat on features)?

○ How do we expect the schema to apply to these sequences: $\overset{\text{̣}}{q}l\overset{\text{̣}}{q}$, $\overset{\text{̣}}{p}l\overset{\text{̣}}{q}$?

¹ Kisseberth has g with a dot below, but dot won't show under the g in my font.

- Here are the data: /q̣laq/:

| | |
|--------------------------|--------------------------------|
| nčoq- laq -Wi:y-a | ‘ears are stopped up’ |
| nčoq- lG -a | ‘ears are almost stopped up’ |
| | |
| hos-taq- laq | ‘make him stop!’ |
| hos-taq- lG -a | ‘makes someone stop an action’ |
| toq- lG -a | ‘stops an action’ |
- /p̣laq/:

| | |
|-------------------------|------------------------------|
| sno-ntap- laq -s | ‘rotted woka ² s’ |
| sno-ntap- lG -a | ‘causes to rot down’ |
- How about an OT analysis? Can we easily rule out *q̣lq → qlq?

3. Southern Kikuyu (self-counterbleeding)

(Gikuyu/Kikuyu is a Niger-Congo language of Kenya with 7.2 million speakers; datum from Johnson 1970, originally from Bennett 1967, which I also didn’t have a chance to consult)

k → γ / __ V₀[voiceless stop]

- What should happen to /nekakaakeroma/ ‘he will bite him’ in SPE? OT?

- Here’s the datum: [neyayaakeroma] (*[nekayaakeroma]) [Is it reduplicated, though?]

² some kind of aquatic plant gathered for food

4. Tshiluba (self-feeding)

(Lua-Kasai/Tshiluba is a Niger-Congo language of D.R. of Congo with 6.3 million speakers; original consultant work from Johnson 1970)

$l \rightarrow n / [+nasal] V_0 _$

| | | | |
|-------------------------------|------------------|--|------------------------|
| u-kwač-ile | ‘he took’ | u-d ^y im-ine | ‘he cultivated |
| ku-kwač-il-a | ‘to take (ben.)’ | ku-d ^y im-in-a | ‘to cultivate (ben.)’ |
| u-kwač-id ^y -ile | ‘he took (ben.)’ | u-d ^y im-in ^y -ine | ‘he cultivated (ben.)’ |
| ($l \rightarrow d^y / _i$) | | | |

- In an OT analysis, can we easily rule out *u-d^yim-in^y-ile? *u-d^yim-il^y-ile?

5. Self-counterfeeding?

- Howard 1972 presents some possible cases but reanalyzes them. Kaplan 2008 reanalyzes many purported cases of self-counterfeeding.
- Kavitskaya & Staroverov 2010 present a case from Tundra Nenets (Nenets is a Uralic language of Siberia and Arctic Russia with 31,300 speakers):
 - /Λ/ deletes in even-numbered syllables (from left edge) and final syllable
 - subject to consonant-cluster constraints, roughly no complex onsets, and complex codas must have falling sonority

| | | | |
|-----------|-----------|---------------------|------------------------------|
| /xΛrΛΛ/ | → xΛr | ‘knife-nom.sg.abs.’ | |
| /xΛrΛ-rΛ/ | → xΛ.rΛ-r | ‘knife-2sg.poss’ | I assume [rr] is a bad coda. |
| /xΛrΛ-ta/ | → xΛr.-da | ‘knife-3sg.poss’ | |

| | | | |
|-------------|--------------|---------------------|-------------|
| /xarΛtΛ/ | → xa.rΛd | ‘house-nom.sg.abs.’ | [see below] |
| /xarΛtΛ-rΛ/ | → xar.dΛ-r | ‘house-2sg.poss’ | |
| /xarΛtΛ-ta/ | → xar.dΛ.-da | ‘house-3sg.poss’ | |

/nultΛnΛ-s^jΛ/ → nult.nΛ-s^j ‘house-3sg.poss’

- But note that the resulting surface forms do have [Λ]s in even-numbered and final syllables:

/xarΛtΛ-ta/ → xar.dΛ.-da ; xar.dΛ.-da ↗ xard.da (though *rdd* is apparently legal)

- Can we capture this with rules? OT?

- Consider /xarʌtʌ/ → xa.rʌd, *xard. Can our SPE analysis capture this? It's not just plain self-counterfeeding.
- K&S make the generalization that two /ʌ/s never delete in a row. Does that help?

[K&S's analysis involves OT machinery we won't have a chance to cover in this course, Candidate Chains (McCarthy 2007).]

6. Self-counterfeeding? again: morphological truncation

- Most famous case is Lardil (discussed extensively in Prince & Smolensky 2004, based on Hale 1973, but see Round 2011 for a fresh take with new data).
- Tohono O'odham (variety of O'odham, Uto-Aztecan language from Arizona and Sonora with about 9,600 speakers; Lewis 2009). Data here are from Fitzgerald 2002:

| <i>imperfective</i> | <i>perfective</i> | |
|---------------------|-------------------|--|
| míɖ | mí: | 'running' |
| ǰúɲ | ǰú: | 'being a certain time of day or night' |
| hím | hí: | 'walking' |
| húg | hú: | 'eating object' |
| nóɖ | nó: | 'bending object' |
| ɲáɲ | ɲé: | 'waking up' |
| wúɖ | wú: | 'tying object with rope' |
| ʂí:sp | ʂí:s | 'pinning' |
| híkčk | híkč | 'cutting' |
| bídʂp | bídʂ | 'painting object' |
| híhim | híhi | 'walking (pl)' |
| híhink | híhin | 'barking (pl)' |
| ɲíɲok | ɲíɲo | 'speaking (pl)' |

- Let's compare basic SPE and OT analyses.

7. Interim conclusions

- As we'd expect, OT has trouble handling self-counterbleeding and self-counterfeeding, and predicts self-feeding and self-bleeding straightforwardly.
- But what about rule theories? It's not as simply as choosing two different orders for rules. What additional flexibility could we give the rule theory to allow all four types of self-interaction?

Now some directionality issues...

8. Tricky case from Latvian; from SPE, pp. 365-366,³ which uses different features

glide formation: $\begin{bmatrix} -\text{cons} \\ +\text{high} \end{bmatrix} \rightarrow [-\text{syll}] / ___ [+ \text{syll}]$

truncation: $V \rightarrow \emptyset / ___ \#$

- First, remember the special convention about the + boundary: / $___ Y$ is really / $___ (+)Y$. That means that every rule is really a schema (can you see how?)!

- Apply the rules to these cases and discuss:

| | |
|--------------|----------------------|
| /#iāi+a#/ | ‘rides’ |
| /#kuru+iai#/ | ‘basket (gen. sg.)’ |
| /#aui+a#/ | ‘puts on (footgear)’ |

- Here are the actual outcomes, apparently: [jaj], [kurwja], [auj]. Are these problematic for any of the rule approaches we’ve seen?

- How about an OT analysis? What problems do we run in to?

9. Possible solution: directional application

- Left-to-right: Scan the string for the leftmost eligible segment and apply the rule to it. Then scan the resulting form for the leftmost eligible segment, etc.
- Right-to-left: Same thing but start with the rightmost eligible segment.
- Does one of these work for Latvian?

³ Originally from Halle & Zeps 1966. But see Christina Skelton’s 200A paper from 2009: the data are uncertain and the underlying forms are open to question.

10. Tianjin tone sandhi

A northern dialect of Mandarin. (Milliken et al. 1997, Chen 2000; see also Kuang 2008)

| | | | | |
|------------------|--------|----------------|----|-------------------------|
| <i>the tones</i> | tone A | 21 or 11 | L | [descriptions disagree] |
| | tone B | 45 or 55 | H | |
| | tone C | 13, 213, or 24 | LH | |
| | tone D | 53 | HL | |

basic rules

| | | | | |
|---------|--------------------------------------|---|-------------------------------------|----------------|
| AA → CA | bing ^L gao ^L | → | bing ^{LH} gao ^L | ‘ice cream’ |
| CC → BC | shui ^{LH} guo ^{LH} | → | shui ^H guo ^{LH} | ‘fruit’ |
| DD → AD | si ^{HL} lu ^{HL} | → | si ^L lu ^{HL} | ‘bus route #4’ |
| DA → BA | da ^{HL} jie ^L | → | da ^H jie ^L | ‘street’ |

- Why these rules? Who knows! Tone sandhi tends to be pretty arbitrary synchronically. See Mortensen 2006 for a framework in which to analyze tone sandhi.
- You see the problem: what about /AAA/? /DDD/? /DDA/? /CCC/? /CAA/? /ADD/? /DAA/?

For /DDD/ it depends on the syntactic structure (say Milliken et al.; Chen says always BAD):

[[su^{HL} liao^{HL}] bu^{HL}] → AAD (L.L.HL) ‘plastic cloth’ (how to prevent *CAD?)
 [shang^{HL} [yi^{HL} yuan^{HL}]] → DAD (HL.L.HL) ‘House of Lords’ (*BAD?)

/AAA/: [[Xi^L guan^L] Jie^L] → ACA (L.LH.L) ‘Xiguan Street’, not *CCA or *BCA
 [kai^L [fei^Lji^L]] → ACA (L.LH.L) ‘fly an airplane’

/DDA/: [[si^{HL}ji^{HL}] qing^L] → ABA (L.H.L) ‘evergreen’
 [zuo^{HL} [dian^{HL} che^L]] → ABA (L.H.L), not *DBA ‘take a tram’

and, schematically:

| | | |
|-------|---|-------------------------|
| /CCC/ | → | BBC (LH.LH.LH → H.H.LH) |
| /CAA/ | → | BCA (LH.L.L → H.LH.L) |
| /ADD/ | → | CAD (L.HL.HL → LH.L.HL) |
| /DAA/ | → | DCA (HL.L.L → HL.LH.L) |

- We’ll leave some of this as a paradox—there’s an extensive literature you can google, though.

Now some optionality issues when there are multiple targets...

Cases taken from Kaplan 2011, Riggle & Wilson 2005, Vaux 2008—good sources for term-paper topics!! See those papers for various approaches to multi-site optionality.

11. Warao: global optionality

Language isolate of Venezuela, Guyana, and Suriname; 28,100 speakers. From Osborn 1966.

- Little raw data, but Osborn is very definite about the generalization:
 “/p/ has allophones [p b]. The voiced allophone [b] is heard more frequently than the voiceless [p] in most words. In every word, except for a few words noted below, alternation between [b] and [p] is presumably possible, since many alternations of this order have been heard. Thus in /paro+parera/ *weak*, both the initial and medial phoneme /p/ is heard as [b] generally, and as [p] infrequently. In words like the one cited, with two or more occurrences of /p/, the allophones are consistently [b] or [p] for each utterance of the word. If the first occurrence of /p/ in the word is [b], the following occurrence(s) will be [b]. If the first occurrence is [p], the following occurrence(s) will be [p]. The following are examples of words with two occurrences of /p/: poto+poto *soft*, apaupute *he will put them*, kapa+kapa *kind of banana*.” (p. 109)

I.e., [paro-parera] ~ [baro-barera], but not *[paro-barera] or *[baro-parera].

Also, for a non-reduplicative case, [hapisapa] ~ [habisaba] ‘other side’

- Does this work in OT? We need a theory of OT variation—try variable constraint ranking. How might it work in SPE+variation?

- As discussed by Riggle & Wilson, Kaplan, it would be nice to have more than two non-reduplicated words, or another language where this happens!

12. Local optionality—also hard to find good cases (besides French; see below)

- Vaux reports that he can produce, for English *marketability*:
 [maɪkətʰəbɪlətʰi] ~ [maɪkərəbɪləri] ~ [maɪkətʰəbɪləri] ~ [maɪkərəbɪlətʰi]
- Can any of our ideas for SPE+variation get this? OT+variation ideas?

(See Kaplan 2014 for an idea: different markedness constraints apply to different /t/s in this case because of their different foot positions.)

13. Vata: iterative optionality

Ethnologue classifies as dialect of Lakota Dida, a Niger-Congo language of Côte d'Ivoire with 98,8000 speakers. Data taken from Kaplan 2009; originally from Kaye 1982, which I didn't consult.

[+ATR]: [i,u,e,o,ʌ] [-ATR]: [ɪ, ω, ε, ɔ, a]

- [+ATR] optionally spreads to the final syllable of a preceding word:
/ɔ̃ ni sáká pɪ̃/ → ɔ̃ ni sáká pɪ̃ ~ ɔ̃ ni sákʌ pɪ̃ 'he didn't cook rice'
- If all the words are monosyllabic...
/ɔ̃ ká zā pī̃/ → ɔ̃ ká zā pī̃ ~ ɔ̃ ká zʌ pī̃ ~ ɔ̃ kʌ zʌ pī̃ ~ ɔ̃ kʌ zʌ pī̃ 'he will cook food'
- Can we get this one?

14. Hypercorrection in Dominican Spanish: unique-target optionality

(Vaux calls this "Basic Optionality")

Dialect of the Indo-European language from Spain with 328 million speakers worldwide. Data from Bradley 2006. See there for original data sources, esp. Núñez-Cedeño 1994, which I didn't get a chance to consult. If you fancy this as a term-paper topic, check out Bullock & Toribio 2010.

- /s/ typically deletes in a syllable coda:

| | | |
|--------------------------|-----------------------------|--------------|
| <i>Dominican Spanish</i> | <i>Conservative Spanish</i> | |
| se.co | se.co | 'dry' |
| ca.so | ca.so | 'case' |
| e.tú.pi.do | es.tú.pi.do | 'stupid' |
| do | dos | 'two' (p. 3) |
- Hypercorrection can insert a coda /s/ (in the "hablar fisno" speech style):⁴

| | | |
|------------------------|---------------------|---------------|
| <i>Dominican fisno</i> | <i>Conservative</i> | |
| e.tús.pi.do | es.tú.pi.do | 'stupid' |
| de.des | des.de | 'since' |
| in.vis.tado | in.vi.ta.do | 'guest' |
| co.mos | co.mo | 'like' (p. 4) |
- And there can be variation:

| | | |
|--|---------------------|-----------------|
| <i>Dominican fisno</i> | <i>Conservative</i> | |
| as.bo.ga.do ~ a.bos.ga.do ~ a.bo.gasdo ~ a.bo.ga.dos | a.bo.ga.do | 'lawyer' (p. 4) |
- But, apparently there can only be one inserted s:⁵ *as.bo.ga.dos, etc.
- Any ideas, for each theory?

⁴ though not before an otherwise intervocalic tap or trill, because the result would be phonotactically illegal

⁵ See p. 24 for discussion of an apparent counterexample given by Harris.

15. Optionality and self-bleeding: French schwa-deletion

Indo-European language from France and surroundings with 67.8 million speakers worldwide.

- There's a big literature on this; Dell 1970 is a good place to start.
- /ə/ optionally deletes, except when it would create a bad consonant cluster.

| | | | |
|-------------------|---|--------------------------------------|--|
| /suvəniR/ | → | [suvəniR] ~ [suvniR] | 'to remember' |
| /pasəRə/ | → | [pasəRə] ~ [pasRə] | 'will pass' |
| /parvəniR/ | → | [parvəniR] * [parvniR] | 'to reach' ([RV] bad coda, [vn] bad onset) |
| /sufləRə/ | → | [sufləRə] * [sufləR] | 'will blow' ([VflRV] unsyllabifiable) |
| /ãri dəvə partir/ | → | [ãri dəvə partir] ~ [ãri dve partir] | 'Henri had to go' |
| /ʒak dəvə partir/ | → | [ʒak dəvə partir] * [ʒak dve partir] | 'Jacques had to go' ([kdv]) |

- What does basic SPE predict for this form (pretend the rule is obligatory): /ty dəvəne/ 'you were becoming'
- Actual result is (supposedly) [ty dəvəne] ~ [ty dvəne]⁶ ~ [ty dəvne], but *[ty dvne]—discuss.

16. Anderson 1974's solution

- Find all segments eligible for the rule and circle them.
- For each circled segment, underline the smallest environment that lets the segment meet the rule's structural description.
- If the rule is optional, you may uncircle some of the eligible segments and de-underline their environments.
- If any circled segment is contained in some other circled segment's underlined environment, uncircle (and de-underline the environments of) as few segments as possible to get rid of these overlaps.
- Now apply the rule simultaneously to the remaining circled segments.

(Of course, circling and underlining themselves have no theoretical status—this is just a convenient way to say “identify targets and environments”)

- What does Anderson's proposal predict for French /ty vudre kə sə kə lə bədo/⁷ 'you would like that what the beadle...'?

⁶ Some speakers have said they don't like this one...

⁷ I got this from an online appendix to David Odden's *Introducing Phonology* (2005: Cambridge UP): www.ling.ohio-state.edu/~odden/IntroducingPhonology/Theory%20Discussion.html

- Does Anderson's proposal help with Klamath? Kikuyu? Latvian? Tianjin?

17. Summary of today

- In a rule theory, there are a few possibilities for how a rule—variable or otherwise—should apply when there are multiple targets for it in a form
 - simultaneously to all targets?
 - tag some rules as left-to-right or right-to-left?
 - simultaneously, except not to a target that's a crucial part of another target's environment?
- Each possibility makes different predictions about what type of languages should exist.
- Classical OT makes very clear predictions about how this should work: are they correct?
 - e.g., does self-counterfeeding really exist? Or, as Kaplan argues, are the apparent cases explainable in another way?
- Different ways of allowing variation in a rule or constraint theory also make different predictions about what types of variation can exist—again, whose predictions match the typology?

Next week: We'll do something similar, but for how multiple processes interact. We'll see what predictions different theories make about how much look-ahead there should be, and different kinds of opacity.

References

- Anderson, Stephen R. 1974. *The Organization of Phonology*. New York: Academic Press.
- Barker, M. A. R. 1963. *Klamath Dictionary*. Vol. 31. Berkeley: University of California Press.
- Bennett, P. 1967. Dahl's Law and Thagicu'. *African Language Studies* 8. 127-159.
- Bradley, Travis. 2006. Spanish rhotics and Dominican hypercorrect /s/. *Probus* 18(1). 1-33.
- Bullock, Barbara E & Almeida Jacqueline Toribio. 2010. Correcting the record on Dominican [s]-hypercorrection. *Romance Linguistics 2009: selected papers from the 39th Linguistic Symposium on Romance Languages (LSRL)*, 15-24. John Benjamins Publishing Company.
- Chen, Matthew Y. 2000. *Tone sandhi: patterns across Chinese dialects*. Cambridge: Cambridge University Press.
- Dell, Francois. 1970. Les regles phonologiques tardives et la morphologie derivationnelle du francais.. MIT.
- Fitzgerald, Colleen. 2002. Covert quantity sensitivity in Tohono O'odham.. Paper presented at the Texas Linguistic Society, University of Texas at Austin.

- Hale, Kenneth. 1973. Deep-surface canonical disparities in relation to analysis and change: An Australian example.. In Thomas Sebeok (ed.), *Current Trends in Linguistics*, vol. 9: Diachronic, Areal and Typological Linguistics, 401–458. The Hague: Mouton.
- Halle, Morris & Valdis Zeps. 1966. A survey of Latvian morphophonemics. *Quarterly Progress Report of the Research Laboratory of Electronics* 83. 104–113.
- Howard, Irwin. 1972. A Directional Theory of Rule Application in Phonology.. MIT.
- Johnson, Douglas C. 1970. *Formal aspects of phonological description*.. Mouton.
- Josephs, Lewis S. 1990. *New Palauan-English dictionary*.. Honolulu: University of Hawaii Press.
- Kaplan, Aaron F. 2008. Noniterativity is an emergent property of grammar.. University of California, Santa Cruz.
- Kaplan, Aaron F. 2011. Variation Through Markedness Suppression. *Phonology* 28(03). 331-370. doi:10.1017/S0952675711000200.
- Kavitskaya, Darya & Peter Staroverov. 2010. When an Interaction Is Both Opaque and Transparent: The Paradox of Fed Counterfeeding. *Phonology* 27(02). 255-288. doi:10.1017/S0952675710000126.
- Kaye, Jonathan. 1982. Harmony processes in Vata.. In Harry Van der Hulst & Norval Smith (eds.), *The structure of phonological representations*, vol. II, 385-452. Foris.
- Kisseberth, Charles W. 1972. An Argument against the Principle of Simultaneous Application of Phonological Rules. *Linguistic Inquiry* 3(3). 393-396. (16 January, 2012).
- Kuang, Jianjing. 2008. Tone sandhi in Tianjin dialect.. Manuscript. UCLA, ms.
- Lewis, M. Paul (ed.). 2009. *Ethnologue: languages of the world*. 16th ed. Dallas, TX: SIL International.
- McCarthy, John J. 2007. *Hidden generalizations: phonological opacity in Optimality Theory*.. London: Equinox.
- Milliken, Stuart R, Guang-Ping Zhang, Xue-Yi Zhang, Zhi-Qiu Li & Ying Lü. 1997. Resolving the paradox of Tianjin tone sandhi.. In Jialing Wang & Norval Smith (eds.), *Studies in Chinese phonology*. Mouton de Gruyter.
- Mortensen, David. 2006. Logical and substantive scales in phonology.. University of California, Berkeley ph.d. dissertation.
- Núñez-Cedeño, Rafael. 1994. The alterability of Spanish geminates and its effects on the Uniform Applicability Condition. *Probus* 6. 23-41.
- Osborn, Henry A. 1966. Warao I: Phonology and Morphophonemics. *International Journal of American Linguistics* 32(2). 108–123.
- Prince, Alan & Paul Smolensky. 2004. *Optimality Theory: Constraint interaction in generative grammar*.. Malden, Mass., and Oxford, UK: Blackwell.
- Riggle, Jason & Colin Wilson. 2005. Local optionality.. In Leah Bateman & Cherlon Ussery (eds.), *NELS* 35.
- Round, Erich. 2011. Word final phonology in Lardil: implications of an expanded data set. *Australian Journal of Linguistics* 31.
- Vaux, Bert. 2008. Why the phonological component must be serial and rule-based.. In Bert Vaux & Andrew Nevins (eds.), *Rules, constraints, and phonological phenomena*. Oxford University Press.