Class 4: The duplication and conspiracy problems

To do
- Korean rule ordering assignment is due this Friday (Oct. 12)
- Next reading questions, on Prince & Smolensky 1993, are due Monday (Oct. 15) in class
- Assignment on this week's material will be posted soon, due Oct. 19

Overview: Sometimes it looks like multiple parts of the grammar are doing the same thing. Is this bad, and if so can we do anything about it?

0. Three items before we get to today's topic

- Discuss final project—show handouts
- While I've got a computer here, show Floris van Vugt's Pheatures program
- Discuss K&K ch. 3 & ch. 9 reading questions

1. Dynamic vs. static phonology

The 'dynamic' phonology of a language is the phonology that shows up in alternations. We have analyzed this with rules:

cat[s]	walk[t]
dog[z]	jog[d]
pea[z]	flow[d]

The 'static' phonology is the generalizations that hold of monomorphemic words. Often analyzed with morpheme structure rules/constraints:

*[lugt], *[nibs]

- Let's try writing both a morpheme structure rule and a morpheme structure constraint for this

2. Conceptual remarks

- Morpheme structure rules are weird:
  - no one is claiming that the English lexicon actually contains words like /ækd/, repaired by MSR to *ækt*
  - after all, on hearing [ækt], why would a learner construct a lexical entry /ækd/ instead of /ækt/?
- But the prohibition on *ækd* must be expressed <u>somewhere</u> in the grammar of English, if speakers know it:
  - e.g., if they reject *ækd* as a new word, or have trouble distinguishing between *ækd* and a legal alternative.
- Some might claim that the lexicon contains /ækD/, with a final consonant underspecified for [voice].
  - Still, if the MSR applies only to underspecified Cs, what *would* happen to hypothetical /ækd/? What prevents it from existing?

- This comes back to the 'lexical symmetry' idea we see in K&K's discussion of Russian final devoicing:
  - the grammar needs to explain, one way or another (phoneme inventory, MSRs, or rules), why certain types of underlying forms don't occur.

- An even weirder case: some English speakers think that *slol* and *smæŋ* sound funny.[1] If we tried to write a rule to change them, instead of merely a constraint banning them, what would they change to??

3. Example: Estonian

(Finno-Ugric language with 1,100,000 speakers, mainly in Estonia)
The basic data are always cited as being from Prince 1980, but I couldn't find them there. Data below are just orthographic [which does not reflect all three length levels], from this Estonian noun decliner: www.filosoft.ee/gene_et, using additional roots from Blevins 2005.

Estonian content morphemes have a minimum size: at least two syllables or one heavy syllable (where a word-final C doesn't contribute to length):

*/ko/, */ma/, */kan/

Estonian also has a rule deleting final vowels in the nominative sg.:

	nom. pl	*nom. sg.*	
/ilma/	ilm**a-**d	ilm	'weather'
/matsi/	mats**i-**d	mats	'lout'
/konna/	konn**a-**d	konn	'frog'
/tänava/	tänav**a-**d	tänav	'street'
/seminari/	seminar**i**-d	seminar	'seminar'
/tuleviku/	tulevik**u**-d	tulevik	'future'
/raamatu/	raamat**u**-d	raamat	'book'

But the rule fails to apply in certain cases:

/pesa/	pes**a**-d	pes**a**	'nest'
/kana/	kan**a**-d	kan**a**	'hen'
/koi/	ko**i**-d	ko**i**	'clothes-moth'
/maa/	ma**a**-d	ma**a**	'country'
/koli/	kol**i**-d	kol**i**	'trash'

- Let's try to write a mini-grammar for Estonian that tries to capture these facts. What's unsatisfying about it?

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[1] There are few monosyllabic words like this—here are all the examples from the CMU Pronouncing Dictionary, excluding probable proper names. OED has a few more but they were all previously unknown to me.
s{p,m}C_0VC$_0${p,b,m}: smarm(y), smurf, spam, sperm, spiff(y), spoof
s{m,n}C_0VC$_0$(m,n,ŋ}: smarm(y)
{ʃ,s]{l,r}C_0VC$_0${l,r}: shrill, slur, slurp—notice none with *l...l* or *r...r*
skC_0VC$_0${k,g,ŋ}: skink, skulk, skunk

4. The duplication problem (Kenstowicz & Kisseberth 1977)

= cases where phonological rules and morpheme structure constraints seem to be doing the same thing ('duplicating' each other's effects).

- These troubled researchers from the late 1970s onwards, because it seems (although we don't actually know) that a single phenomenon (e.g., avoidance of sub-minimal words) should have a single explanation in the grammar.

- Let's review the Chamorro issue.

5. Shortening a grammar

Using the brace notation to collapse $\varnothing \rightarrow V / C \_\_ C\#$
$\varnothing \rightarrow V / C \_\_ CC$
into the shorter $\varnothing \rightarrow V / C \_\_ C\{C,\#\}$ says that these rules have something significant in common. (Why? recall SPE's evaluation metric...)

6. Kisseberth: cases where the notation doesn't allow shortening

These rules have something in common too (what?), but they can't be collapsed using curly brackets:

$\varnothing \rightarrow V / C \_\_ CC$
$C \rightarrow \varnothing / CC + \_\_$

Cases like this are called *conspiracies*, and their widespread existence is the *conspiracy problem*.

(The difference between a case of the duplication problem and a case of the conspiracy problem is sometimes fuzzy and the terms are sometimes used interchangeably.)

7. Constraints as rule blockers

As you read, Kisseberth proposes using a constraint to make the rules of Yawelmani simpler:

Instead of $V \rightarrow \varnothing / V\ C \underset{[-long]}{\_\_\_\_\_}\ C\ V$

use $V \rightarrow \varnothing / C \underset{[-long]}{\_\_\_\_\_}\ C$ subject to the constraint *CCC (or *{C,#}C{C,#})

The constraint can *block* the rule: the rule applies only if the result doesn't violate the constraint.

- Let's try to lay out, step by step, what an algorithm would have to do to implement the rule and its blocking constraint

8. Constraints as rule triggers

Kisseberth also proposes that constraints can *trigger* rules: a rule applies only if it gets rid of a constraint violation.

- What happens if the rule ∅ → i (context-free) applies only when triggered by the constraint *CC? Again, we're a computer—we have to break this down into simple steps

9. Why is this good?

In a system without constraints, these two grammars have equal length and should be equally plausible:

Yokuts

$$C \rightarrow \varnothing \;/\; CC + \_\_$$
$$\varnothing \rightarrow i \;/\; C \_\_ CC$$
$$V \rightarrow \varnothing \;/\; V\ C \underset{[-long]}{\_\_\_}\ C\ V$$

imaginary and implausible

$$C \rightarrow \varnothing \;/\; CV + \_\_$$
$$\varnothing \rightarrow i \;/\; V \_\_ CC$$
$$V \rightarrow \varnothing \;/\; V\ C \underset{[-long]}{\_\_\_}\ C\ C$$

But in Kisseberth's system the Yokuts grammar is shorter than the "implausible" grammar

Yokuts

$$C \rightarrow \varnothing \;/\; + \_\_$$
$$\varnothing \rightarrow i$$
$$V \rightarrow \varnothing \;/\; C \underset{[-long]}{\_\_\_}\ C$$
$$*\{C,\#\}C\{C,\#\}$$

imaginary and implausible

$$C \rightarrow \varnothing \;/\; CV + \_\_$$
$$\varnothing \rightarrow i \;/\; V \_\_ CC$$
$$V \rightarrow \varnothing \;/\; V\ C \underset{[-long]}{\_\_\_}\ C\ C$$

If we're right that the language on the right is less plausible than Yokuts, Kisseberth's theory is better because it captures that difference.

10. Problems for triggering

- What happens if the grammar has a rule ∅ → i (with no context) and a constraint *CCC?

  /arbso/

- What happens if a grammar has rules ∅ → i and C → ∅ and a constraint *CC?

  /eldu/

11. Local summary

We will sweep these problems under the rug, but only until next week.

- Many more conspiracies were identified, giving rise to more constraints.
- People liked constraints, because they solved the conspiracy problem and also gave theoretical status to the idea of "markedness", which had been floating around.
  - Everyone knew languages don't "like" CCC sequences (they are "marked"), but this was not directly encoded in grammars until constraints like *CCC came along.

One more item on next page, if time (but to save paper, "Next" and references are on this page)

Next:

- Take a day or two to feel uncomfortable about ignoring conspiracies, yet also uncomfortable about exactly how constraints are supposed to work.
  - This was the state of many phonologists through the 1970s and 1980s.
- Then, you'll read excerpts from Prince & Smolensky's 1993 manuscript introducing Optimality Theory (OT), an all-constraint theory.
- Next week we'll cover the basics of OT.
- The rest of the course will explore the differing predictions that SPE, OT, and their variants make about phonologies.

References

Blevins, James P. 2005. Word-based declensions in Estonian. *Yearbook of Morphology* 2005. 1–25.

Kenstowicz, Michael & Charles Kisseberth. 1977. *Topics in Phonological Theory*.. New York: Academic Press.

Prince, Alan. 1980. A metrical theory for Estonian quantity. *Linguistic Inquiry* 11. 511–562.

Zuraw, Kie & Yu-An Lu. 2009. Diverse repairs for multiple labial consonants. *Natural Language and Linguistic Theory* 72. 197–224.

12. Skip if no time: the "international conspiracy" problem

Sometimes different rules in different languages seem to be aiming for the same surface patterns.
Example: cognate infixes in some Western Austronesian languages—see Zuraw & Lu 2009 for details and references.

	Tagalog (Philippines)	Timugon Murut (Indon.)	Sarangani Blaan (Phil.)	Limos Kalinga (Philippines)	N. Acehnese (Indonesia)	Palauan (Palau)	Kulalao Paiwan (Taiwan)	Tjuabar Paiwan (Taiwan)
p/f	pili, p**um**ili	patoj, **m**atoj	fati, **m**ati	pija, k**um**ija	pubɯˀt, S**ɯm**ubɯˀt	--	pili, p**n**ili	pajsu, p**ən**ajsu
t	takbo, t**um**akbo	tuun, t**um**uun	tiis, t**m**iis		tulak, t**ɯm**ulak	toŋakl, t**m**oŋakl	tulək, t**m**ulək	təkəl̪, t**əm**(ə)kəl̪
s	sulat, s**um**ulat		salo?, s**m**alo?		Saluˀn, S**ɯm**aluˀn	sisij?, s**m**isij?	sapuj, s**m**apuj	supu, s**əm**upu
k	kuha, k**um**uha		kɔ?ɔn, k**mɔ**?ɔn	kan, k**um**an	kalɤn, k**ɯm**alɤn	kiwt, k**m**iwt	kan, k**m**an	kan, k**əm**an
b/v	bili, b**um**ili	bigod, **m**igod	bunal, **m**unal	bulbul, g**um**ulbul	blɔˀ, **mu**blɔˀ	basə?, **m**asə?	burəs, b**n**urəs vuʌu, v**n**uʌu	
d/ð	datiŋ, d**um**atiŋ		dado, d**m**ado	dakol, d**um**akol	dɯŋɤ, d**ɯm**ɯŋɤ	ðakl, θ**m**akl	dət, d**m**ət	dapəs, dapəs
g	gawa, g**um**awa	gajo, g**um**ajo			gantoŋ, g**ɯm**antoŋ	--	gudəm, g**m**udəm	giriŋ, g**əm**iriŋ
						ðobə?, ð**w**obə? ðaləm, ð**w**aləm		təvəl̪a, t**ən**(ə)vəl̪a

Moral

➔ Even if referring to a constraint doesn't simplify the grammar of an individual language, it may seem to explain cross-linguistic patterns. (Following SPE reasoning, where that which is frequent cross-linguistically is thought to be favored by learners, we might conclude that such a constraint is somehow "natural" for learners to construct. Do we need an evaluation metric for constraints?)