Class 6: The duplication and conspiracy problems

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?

How this fits in: My ulterior motive is to make you yearn for constraints today, then next time experience the agony of trying to make them work in a rule theory, so that you can understand why phonologists embraced OT (just constraints, no rules) so enthusiastically.

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]

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

  [læps], [lɪst] but no words like *[læpz], *[lɪsd]

? Let's try writing both a phonological rule and a morpheme structure rule for this. Then, let's see if we can devise an "ordering solution" as you read about in (Kenstowicz & Kisseberth 1977).

2. Side point: why *morpheme* structure constraints and not *word* structure constraints?

- English *words* can have sequences like *si[ksθs]* and *a[skt]*
  - But English *morphemes* can't
- Two-handed ASL *morphemes* must obey "Battison's conditions" (Battison 1978)
  - Symmetry Condition: if non-dominant hand moves, must have same handshape and movement as dominant hand (can be "alternating" though, as we saw earlier)
  - Dominance Condition: if non-dominant hand doesn't move, handshape is from a restricted set
    - 

[1]
- But when a root morpheme is combined with a "classifier" morpheme, Battison's conditions can be violated in the resuling *word*
  - Example from Emmorey 2001, p. 87: ASL 'A bicycle is near the house'
  - During BIKE, the weak hand is making a shape that is not from the usually-allowed set *[I think this doesn't count as a C shape]*, because it represents the classifier for 'whole entity' (refers back to HOUSE)

3. Conceptual remarks

- Morpheme structure rules/constraints 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 somewhere 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.

[1] Thanks, www.wpclipart.com/sign_language !

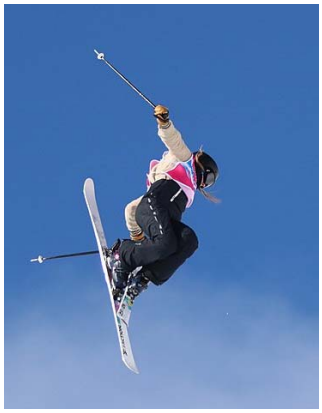
- Some might claim that the lexicon contains /ækD/, with a final consonant underspecified for [voice].
  - Still, if the MSR applies only to underspecified Cs, what *would* happen to hypothetical fully specified /ækd/? What prevents it from existing??

- This comes back to the 'lexical symmetry' idea we saw 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.

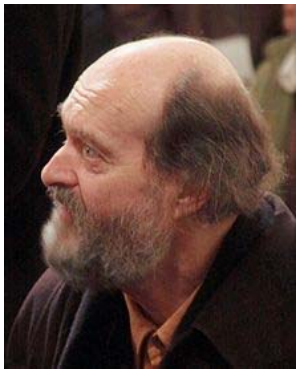
? An even weirder case: some English speakers think that *slol* and *smæŋ* sound strange.[2] But if we tried to write a rule to change them, instead of merely a constraint banning them, what would they change to??

4. Example: Estonian

- Finno-Ugric language from Estonia with 1.1 million speakers
- Official language of Estonia
- Some notable Estonian speakers:



Kelly Sildaru, freestyle skier



Arvo Pärt, composer

Kerli, singer/songwriter

- I've seen the basic data cited as being from Prince 1980, but I couldn't find them there (??).
  - Data below are just spelling [which does not reflect all three length levels] plus some guesses about syllabification that I hope are reasonable, from this Estonian noun decliner: www.filosoft.ee/gene_et, using additional roots from Blevins 2005.

[2] There are few monosyllabic words like this—here are all the examples from the CMU Pronouncing Dictionary, excluding probable proper names. Oxford English Dictionary (oed.com) has a few more but they are pretty obscure.

s{p,m}C₀VC₀{p,b,m}: smarm(y), smurf, spam, sperm, spiff(y), spoof
s{m,n}C₀VC₀(m,n,ŋ}: smarm(y)
{f,s}{l,r}C₀VC₀{l,r}: shrill, slur, slurp—notice none with *l...l* or *r...r*
skC₀VC₀{k,g,ŋ}: skink, skulk, skunk

- Estonian content morphemes have a **minimum size**: at least two syllables or one "heavy" syllable ((C)VV or (C)VCC):
  */ko/, */ma/, */kan/ ← no good because they would be a single "light" syllable

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

	nom. pl	*nom. sg.*	
/ilma/	il.m**a-**d	ilm	'weather'
/matsi/	mat.s**i-**d	mats	'lout'
/konna/	kon.n**a-**d	konn	'frog'
/tänava/	tä.na.v**a-**d	tä.nav	'street'
/seminari/	se.mi.na.r**i-**d	se.mi.nar	'seminar'
/tuleviku/	tu.le.vi.k**u-**d	tu.le.vik	'future'
/raamatu/	raa.ma.t**u-**d	raa.mat	'book'

- But the rule fails to apply in certain cases:

/pesa/	pe.s**a**-d	pe.s**a**	'nest'
/kana/	ka.n**a**-d	ka.n**a**	'hen'
/koi/	ko**i**-d	ko**i**	'clothes-moth'
/maa/	ma**a**-d	ma**a**	'country'
/koli/	ko.l**i**-d	ko.l**i**	'trash'

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

5. 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.

? Can you remember anything about how this plays out in Chamorro?

6. Another duplication case (we saw this word the other day as an example of assimilation)

- Many sign languages require that a content morpheme can have only one handshape (though within that handshape, fingers can open or close during the morpheme)
- When two roots are put together to form a compound word, there is often a rule that assimilates handshape, so that the resulting word obeys the one-handshape maximum.
  - Hong Kong Sign Language example and images from Tang et al. 2010
    - HKSL is related to Chinese Sign Language

TASTE handshape is 

GOOD handshape is 

  - TASTE^GOOD (meaning 'tasty') takes the TASTE handshape plus the 'thumb-extended' feature to get handshape (plus a closing movement): 

- In Estonian, a word-shape requirement **prevents** a rule from applying
- In Hong Kong Sign Language, a word-shape requirement **causes** a rule to apply

7. Shortening a grammar

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

8. Kisseberth 1970: 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:
  ∅ → V / C __ CC
  C → ∅ / CC __

- Cases of languages that have sets of rules 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)

9. Constraints

- The Ø → V and C → Ø rules both seem to be applying to get rid of CCC sequences

- Moreover, there's a rule that could be made simpler if we invoked a **constraint** *CCC
  - Kisseberth proposes…

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,#})

10. Here's another conspiracy: Korean

- The main language of both North Korea and South Korea
- Considered to form Koreanic family together with Jejuan (from Jeju Island)
  - Relationships beyond that more controversial
- About 80 million speakers, including around 150,000 in L.A. County
- Has own writing system

Page from Hunminjeongeum Kaerye, commentary on then-new writing system[3]

Kyung-sook Shin, author of *Please Look After Mom*

Garion, developed rhyming conventions for Korean rap[4]

[3] en.wikipedia.org/wiki/Hunminjeongeum_Haerye#/media/File:Hunminjeongeumhaerye.jpg
[4] twitter.com/Garionhiphop/photo

(Kim & Alderete 2008)

- {p, t, t͡ʃ, k} → [+spread glottis] / h __
  - followed by h → Ø / __ {C, #}
- C → [–spread glottis] / __ {C, #}

❓ Give me the evidence for each of the rules above

a. /su**h**-talk/ → [su.t^{h}ak] ‘rooster’
b. /il**h**-ta/ → [il.t^{h}a] ‘loses’
c. /na**h**.ta/ → [na.t^{h}a] ‘bear’
d. /su**h**-pəm/→ [su.p^{h}əm] ‘male tiger’
e. /co**h**-ke/ → [co.k^{h}e] ‘well’

f. /an**h** / → [an] ‘in’
g. /su**h**/ → [su] ‘male’

h. /na**t^{h}**-kɛ/→ [nat.k’ɛ] ‘piece’
i. /ki**p^{h}**-ta/ → [kip.t’a] ‘it is deep’
j. /a**p^{h}**-to/ → [ap.t’o] ‘front also
k. /mi**t^{h}**-pa-tak/ → [mit.p’a.dak] ‘bottom’

l. /a**p^{h}**/ → [ap] ‘front’
m. /pa**t^{h}**/ →[pat] ‘field’
n. /pu-ə**k^{h}**/ → [pu.ək] ‘kitchen’

❓ Proposals for a good constraint here?

If time, let's try spelling out how some of this would work (otherwise, leave it for next time)…

11. Constraints as rule blockers

- V → Ø / C__C , unless result would violate *CCC

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

12. Constraints as rule triggers

- Ø → i , only if needed to eliminate *CCC violation

? What exactly will happen, step by step?

13. 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/

14. Where this leaves us

- Many more conspiracies were identified, giving rise to more constraints.
- People liked constraints, because they solved the conspiracy problem and also gave clearer theoretical status to the idea of "markedness"
    - 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.
- On the other hand, we'll see that it's unclear exactly how constraints should work.
    - Next time we'll wallow in this problem
    - Then we'll start trying to solve it

Closing item for index cards: Write one thing you're currently finding appealing about constraints, and one thing you're currently finding problematic about them.

References

Battison, Robin. 1978. *Lexical borrowing in American Sign Language*. Silver Spring: Linstok Press.

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

Emmorey, Karen. 2001. *Language, Cognition, and the Brain: Insights From Sign Language Research*. Psychology Press.

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

Kim, Lam & John Alderete. 2008. Why [h] and aspirated consonants are different in Korean. *Toronto Working Papers in Linguistics* 28. https://twpl.library.utoronto.ca/index.php/twpl/article/view/6140. (9 October, 2022).

Kisseberth, Charles. 1970. On the functional unity of phonological rules. *Linguistic Inquiry* 1. 291–306.

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

Tang, Gladys, Diane Brentari, Carolina González & Felix Sze. 2010. Crosslinguistic variation in the use of prosodic cues: The case of blinks. In Diane Brentari (ed.), *Sign languages*, 519–541. Cambridge: Cambridge University Press.