

Class 4: The duplication and conspiracy problems

To do—nothing for Thursday, but looking ahead...

- Palauan rules assignment is due this Friday
- Next reading questions, on Prince & Smolensky 1993, are due Monday

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?

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:

[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. 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.
- 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 funny.¹ If we tried to write a rule to change them, instead of merely a constraint banning them, what would they change to??

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}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

3. Example: Estonian

(Finno-Ugric language with 1,100,000 speakers, mainly in Estonia)

- I've seen the basic data 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.:

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

- But the rule fails to apply in certain cases:

| | | | |
|--------|--------|------|----------------|
| /pesa/ | pesa-d | pesa | 'nest' |
| /kana/ | kana-d | kana | 'hen' |
| /koi/ | koi-d | koi | 'clothes-moth' |
| /maa/ | maa-d | maa | 'country' |
| /koli/ | koli-d | koli | 'trash' |

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

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 you read about.

5. Shortening a grammar

- Using the brace notation to collapse

$$\begin{aligned} \emptyset &\rightarrow V / C _ C\# \\ \emptyset &\rightarrow V / C _ CC \end{aligned}$$
 into the shorter $\emptyset \rightarrow V / C _ C\{C,\#\}$ says that these rules have something significant in common. (Why? recall SPE's evaluation metric...)

6. 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:

$$\begin{aligned} \emptyset &\rightarrow V / C _ CC \\ C &\rightarrow \emptyset / CC + _ \end{aligned}$$
- 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 $V \rightarrow \emptyset / VC _ _ C V$
[−long]

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

- 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 $\emptyset \rightarrow i$ (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:

| | |
|---------------------------------------|---------------------------------------|
| <i>Yokuts</i> | <i>imaginary and implausible</i> |
| $C \rightarrow \emptyset / CC + _$ | $C \rightarrow \emptyset / CV + _$ |
| $\emptyset \rightarrow i / C _ CC$ | $\emptyset \rightarrow i / V _ CC$ |
| $V \rightarrow \emptyset / VC _ C V$ | $V \rightarrow \emptyset / VC _ C C$ |
| [–long] | [–long] |

- But in Kisseberth’s system the Yokuts grammar is shorter than the “implausible” grammar

| | |
|------------------------------------|---------------------------------------|
| <i>Yokuts</i> | <i>imaginary and implausible</i> |
| $C \rightarrow \emptyset / + _$ | $C \rightarrow \emptyset / CV + _$ |
| $\emptyset \rightarrow i$ | $\emptyset \rightarrow i / V _ CC$ |
| $V \rightarrow \emptyset / C _ C$ | $V \rightarrow \emptyset / VC _ C C$ |
| [–long] | [–long] |
| $*\{C,\#\}C\{C,\#\}$ | |

- 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 $\emptyset \rightarrow i$ (with no context) and a constraint *CCC?

/arbso/

- What happens if a grammar has rules $\emptyset \rightarrow i$ and $C \rightarrow \emptyset$ and a constraint *CC?

/eldu/

11. 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’ve seen that using constraints introduces some problems into the theory.
 - Thursday we’ll wallow in these problems
 - Next week we’ll try to solve them

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

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.
- 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.
- Zuraw, Kie & Yu-An Lu. 2009. Diverse repairs for multiple labial consonants. *Natural Language and Linguistic Theory* 27. 197–224.

12. 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, pumili | patoj, matoj | fati, mati | pija, kumija | pubw ^ʔ t, Su^umubw^ʔt | -- | pili, pnili | pajsu, pəⁿnajsu |
| t | takbo, tumakbo | tuun, tumuun | tiis, tmiis | | tulak, tum^umulak | toŋakl, tmoŋakl | tulək, tmulək | təkəl, təm(ə)kəl |
| s | sulat, sumulat | | saloʔ, smaloʔ | | Salu ⁿ , Su^umaluⁿ | sisijʔ, smisijʔ | sapuj, smapuj | supu, sə^mmupu |
| k | kuha, kumuha | | kəʔən, kməʔən | kan, kuman | kalɤn, kumalɤn | kiwt, kmiwt | kan, kman | kan, kə^mman |
| b/v | bili, bumili | bigod, migod | bunal, munal | bulbul, gumulbul | blo ^ʔ , mublo^ʔ | basəʔ, masəʔ | burəs, bnurəs vu ^ʎ u, vnu^ʎu | |
| d/ð | datiŋ, dumatiŋ | | dado, dmado | dakol, dumakol | duŋɣ, du^umɤŋɣ | ðakl, θmakl | dət, dmət | dapəs, də^ppəs |
| g | gawa, gumawa | gajo, gumajo | | | ganton, gumanton | -- | gudəm, gmudəm | giriŋ, gə^mmiriŋ |
| | | | | | | ðobəʔ, ðwobəʔ ðaləm, ðwaləm | | təvə ^ʎ a, təⁿ(ə)və^ʎa |

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?)