
Weeks 11 – The Duplication and Conspiracy Problems and Constraints

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- (1) When multiple parts of the grammar seem to be doing the same thing, some phonologists have smelled a rat.

0.1 Dynamic vs. static phonology

- (2) 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]

- (3) The ‘static’ phonology is the generalizations that hold over some particular domain. Typically the domain of study is monomorphemic words. These generalizations are often analyzed with morpheme structure constraints:

*[ligt], *[nubs]

- (4) Why not with rules? Because we don’t know what change to make: [nubz] or [nups]?

0.2 Conceptual remarks

- (5) Morpheme structure constraints (rules) (MSC or MSR) are funny: no one is claiming that the English lexicon actually contains words like /ækd/, repaired by MSC to [ækt] (after all, why would a learner construct such a lexical entry instead of /ækt/?). But the prohibition on [ækd] must be expressed somewhere in the grammar of English, since speakers know it (they would reject [ækd] as a new word).
- (6) Some might claim that the lexicon contains /ækd/, with a final consonant underspecified for [voice]. Still, if the MSC applies only to underspecified Cs, what would happen to hypothetical /ækd/? What prevents it from existing?
- (7) 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 (MSCs or regular rules), why certain types of underlying forms don’t occur.

- ★ Learning problem: how do English speakers know to reject [ækd] anyway (cf. back down)?

- ★ An even weirder case: many English speakers agree that [slol] and [ʃmæŋ] sound funny. If we tried to write a rule to change them, instead of merely a constraint banning them, what would they change to??

1 The Duplication Problem

- (8) This term refers to cases where rules and morpheme structure constraints seem to be doing the same thing ('duplicating' each other's effects)
- (9) (Kenstowicz & Kisseberth 1977)¹. This 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.

1.1 Example: Estonian

- (10) Estonian (Finno-Ugric language with 1,100,000 speakers, mainly in Estonia.) Estonian content morphemes have a minimum size: at least two syllables or one heavy syllable, where 'heavy' = CVVV or CVCC.

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

- (11) Estonian also has a rule deleting final vowels in the nominative sg. (there's also lengthening, but don't worry about it):

/matsi/	mat:s	'lout, bumpkin, nom. sg.'
/konna/	kon:n	'frog, nom. sg.'
/tænava/	tænav	'street, nom. sg.'
/ilma/	ilm ²	'world, weather, nom. sg.'
/jalga/	jalg	'foot, leg, nom. sg.'

- (12) But it cannot apply in certain cases:

¹Kenstowicz, Michael, and Charles Kisseberth (1977). *Topics in Phonological Theory*. New York: Academic Press.

²I am not sure whether this example and the next may have lengthening.

/kana/	kana	‘hen, nom. sg.’
/koi/	koi:	‘clothes-moth, nom. sg.’
/maa/	maa:	‘country, land, nom. sg.’
/tuba/	tuba	‘room, nom. sg.’
/koli/	koli	‘trash, nom. sg.’

★ Let’s try to write a mini-grammar for Estonian that tries to capture these facts.

2 The Conspiracy Problem

- (13) Phonological conspiracy
- a. More than one process in the same language can be describing as:
 - (i) applying in order to remove a particular type of marked structure (e.g., *CCC), or
 - (ii) not applying (being blocked) when it would create the same type of marked structure.
 - b. Cross-linguistic counterpart: different processes in different languages that remove or fail to create the same type of marked structure (international conspiracy).
 - c. (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.)

2.1 Example: Shortening a grammar

- (14) Using the brace notation to collapse

$$\emptyset \longrightarrow V / C \text{ ______ } C\#$$

$$\emptyset \longrightarrow V / C \text{ ______ } CC$$

into the shorter $\emptyset \longrightarrow V / C \text{ ______ } C\{C,\#\}$ says that the rules have something significant in common.

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

$$\emptyset \longrightarrow V / C \text{ ______ } CC$$

$$C \longrightarrow \emptyset / CC+ \text{ ______ }$$

- (16) Cases like this are called conspiracies, and their widespread existence is the conspiracy problem.

2.2 Kisseberth: functional unity of rules

- (17) Functional unity
- a. Application and blocking of different processes achieve the same ‘function’.
 - b. That function is avoidance of marked structures—the property that provides ‘unity’.
- (18) Kisseberth (1970):
- a. “I am not . . . principally interested in proposing detailed formalism; instead, I would like to encourage phonologists to look at the phonological component of a grammar in a particular way” (293).
 - (i) The significance of this type of pre-theoretical change in perspective should not be underestimated: K in essence suggests a new method of analysis w/out burying us in details.
 - b. “The unity of a set of rules may not rest upon the similarity of their structural descriptions [as in SPE], but rather upon the similarity of their function. Or to put the point in a slightly different way, rules may be alike in having a common effect rather than in operating upon the same class of segments, or performing the same structural change, etc.” (293).
 - c. “The rules which belong to a particular grammar are not entirely arbitrary—one rule may motivate to some extent the existence of another rule” (306).

2.3 Evidence in Yawelmani Yokuts for conspiracies

- (19) No trilateral (CCC) clusters in URs of individual morphemes.
- a. Evidence? Such clusters would be eliminated by the rules below,
 - b. so the claim about URs is difficult at best to justify.
- (20) Verbs. Three rules apply to eliminate CCC and CC# clusters that are created when morphemes are concatenated.
- (21) Vowel deletion rules are written to ensure they do not create CCC or CC# clusters.
- (22) Nouns. Underlying ‘protective’ vowels (morphology? phonology?) prevent CCC clusters

[polm+a:+ni] cf. [po:l+um]

- a. “The requirement that protective vowels appear in underlying representations of nouns is fundamentally related to the rules of reducing consonant clusters, but it is mind-boggling (for me, at least) to think about how a formal theory might be constructed which would reflect this fact” (304).

3 Solution: Constraints

- (23) Kisseberth proposes using a constraint to make the rules of Yawelmani simpler:

- a. Instead of $\overset{V}{[-\text{long}] \longrightarrow \emptyset / VC \text{ ____ } CV}$
use $\overset{V}{[-\text{long}] \longrightarrow \emptyset / C \text{ ____ } C}$ subject to the constraint *CCC.
- (24) The constraint can *trigger* rules or *block* them.

★ Blocking isn't too problematic—how does it work in the example above?

- (25) But triggering might be problematic. What if a constraint triggers multiple competing rules in some cases: how do you choose which rule to apply?

3.1 More conspiracies

- (26) Many more conspiracies have been identified, giving rise to more constraints.

- (27) Some examples we've seen (modulo some opacity)

- Icelandic

- u-epenthesis occurs only if there would otherwise be an unsyllabifiable cluster
- j-deletion occurs only if there would otherwise be an unsyllabifiable cluster
- syncope occurs unless it creates an unsyllabifiable cluster

- Malagasy

- C-deletion occurs only if there would otherwise be an illegal word-final consonant
- consonant changes (h \longrightarrow k , etc.) occurs only if there would otherwise be an illegal word-final consonant
- epenthesis occurs only if there would otherwise be a word-final consonant (i.e., all are illegal) (This formulation is a little weird because word-final *k*, *n*, *t'* are treated as legal by the consonant changes, but illegal by epenthesis)

- Hakha Lai

- All the tone rules eliminate a sequence in which the ending tone of one syllable and the beginning tone of the next syllable don't match.

3.2 A small example of international conspiracy

- (28) Oshikwanyama *NT conspiracy (western Bantu)

- a. Compare the data here ...

kombo		‘goat’ (native word)
sitamba	*sitama	‘stamp’ (loanword)
pelanda	*pelana	‘print’ (loanword)
oinga	*oiNa	‘ink’ (loanword)

b. with the one here ...

/e:ŋ+pati/	→ e:mati	*e:mbati	‘ribs’
/oŋ+pote/	→ omote	*ombote	‘good-for-nothing’
/oŋ+tana/	→ onana	*ondana	‘calf’

★ What are the different processes used to avoid *NT clusters and where do they apply?

(29) Puyo Pongo (Quechua, Eastern Ecuador)

fijki	‘soot’	tʃuntina	‘to stir the fire’
tʃunga	‘ten’	indi	‘sun’
pampalʃina	‘skirt’	ukantʃi	‘we’
hambi	‘poison’	punɕa	‘day’
wasi-ta	‘house’	kan-da	‘you’
ajtʃa-ta	‘meat’	atan-da	‘the frog’
puru-ta	‘gourd’	wakin-da	‘others’
ali-tʃu	‘is it good?’	kan-ɕu	‘you?’
lumu-tʃu	‘manioc?’	tijan-ɕu	‘is there?’
mana-tʃu	‘isn’t it?’	tʃarin-ɕu	‘does he have?’

(objective suffix /-ta/ and question suffix /-tʃu/)

★ What marked structure is being avoided in Puyo Pongo?

★ We have seen other processes occurring in languages which appear to repair ‘marked structure’. Give some examples, what are the logically possible ways such structure could be repaired?

(30) Moral: Even if referring to a constraint doesn’t simplify the grammar of an individual language, it sometimes seems to give some insight into 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. What would that mean? Do we need an evaluation metric for constraints to separate highly valued ones from others?)

4 Morpheme Structure Constraints, Surface Phonetic Constraints, or Both?

- (31) As we have seen there are (at least) two levels of representation in phonology: the underlying and surface forms.
- Morpheme structure constraints (MSCs) are language-specific restrictions on what constitutes a ‘legal’ UR.
 - Surface Phonetic Constraints (SPCs) are language-specific restrictions on what constitutes a ‘legal’ surface form.
 - The term phonotactics, as far as I can tell, originally refers to SPCs, but is often used as a cover term meaning ‘legal sequences over some domain (or level)’.
- (32) It was assumed that MSCs were needed to describe the kinds of legal underlying forms that can exist for some language.

★ What does it mean if this assumption is relaxed?

- (33) Experimental evidence for MSCs? (Esper (1925)³, from discussion in Ohala (1995)⁴)
- Esper taught adult native English-speakers the meanings of 16 new words (colored shapes) and then tested how well they learned them.
 - Three groups
 - group 1: words were like *nasliŋ*, *fownliŋ*, *nasdeg*, *fowndeg* where *nas-*, *fown-* coded color and *-liŋ*, *-deg* coded shape.
 - group 2: words were like *nulgeŋ*, *nuzgub*, *pelgeŋ*, *pezgub* where *nu-*, *pe-* are color morphemes and *-lgeŋ*, *-zgub* are shape morphemes (which violate English MSCs)
 - group 3: some arbitrary list of words.
 - Results: group 1 learned them much better than groups 2 and 3. Group 2 results were similar to group 3s.
 - Esper’s conclusion: English speakers know MSCs.
 - Possible confound: actually testing SPCs. (English doesn’t allow surface intervocalic [zg] clusters tautomorphemically)
- (34) Given MSCs and the phonological rules, some argue that constraints on surface forms are redundant.
- (Postal 1968:214) “an independent phonotactics is necessarily and in all cases useless and redundant in its entirety”, for “every fact which such a separate

³Esper, E.A. 1925. A Technique for the Experimental Investigation of Associative Interference in Artificial Linguistic Material. Language Monographs No. 1.

⁴Ohala, John J. 1995. Experimental Phonology. In John Goldsmith’s (ed) The Handbook of Phonological Theory. Blackwell Publishers, Ltd.

phonotactics describes is accounted for ... by the morpheme-internal restrictions on morphophoneme combinations [MSC's] and the morphophonemic rules which must exist in any event."

- b. Johnson (1972): "On the other hand, there seems to be no need at all for a special component to describe the set of admissible phonetic strings, since this set is determined indirectly by morpheme structure component and the phonological rules."

4.1 Conceptual Arguments for Surface Phonetic Constraints

(35) Shibatani (1973) makes the following arguments:

"It is the SPCs [surface phonetic constraints] of his language which intrude into the pronunciation of a foreign language when an adult learner speaks. The SPCs are acquired in an early stage of mother-tongue acquisition, and they are deeply rooted in the competence of a native speaker." Shibatani (1973:99)

"Postal's and Johnson's view is tantamount to saying that the well-formedness of phonetic representations can be examined only by applying all the phonological rules to all the possible inputs. However, if one claims that a grammar represents a particular speaker's competence (the view held by a generative phonologist), then the position maintained by Postal and Johnson is untenable. For, as has been documented by Moskowitz 1971, a child learns the constraints of phonetic representations during the stage which she calls the period of early acquisition, which is earlier than the stage where a child acquires morphophonemic alternations. Obviously, at this early stage, a child has a highly incomplete lexicon, and consequently very tentative MSC's and few or no morphophonemic rules: yet he knows what is and what is not a well-formed phonetic representation in his language. Thus a grammar which describes the SPC's of a language as something deducible from the MSC's and phonological rules of that language misrepresents an important aspect of man's competence in his language." Shibatani (1973:94)

(36) This last quote is prescient:

- a. Friederici and Wessels (1993), Jusczyk et al. (1993a,b, 1994) also show that children do in fact have knowledge of what is surface legal in their language at about 9 months (before they begin to speak).
- b. Recent phonological rule learning algorithms (for alternations) succeed in part because the learners assume some phonotactic knowledge (Albright and Hayes 2003, Hayes 2004, Prince and Tesar 2004).

4.2 Evidence for Surface Phonetic Constraints

(37) Japanese. Here are some verbs:⁵

⁵This is probably oversimplifying. There have been many different proposals about Japanese verbs—what their underlying forms are and what rules apply. But this is probably close to what Shibatani has in mind.

<i>UR</i>	<i>present</i>	<i>pres. polite</i>	<i>negative</i>	<i>past</i>	
/mat/	mats-u	matʃ-imasu	mat-anai	mat-ta	‘wait’
/kak/	kak-u	kak-imasu	kak-anai	kai-ta	‘write’
/aruk/	aruk-u	aruk-imasu	aruk-anai	arui-ta	‘walk’
/job/	job-u	job-imasu	job-anai	jon-da	‘call’
/asob/	asob-u	asob-imasu	asob-anai	ason-da	‘play’
/isog/	isog-u	isog-imasu	isog-anai	isoi-da	‘hurry’
/hanas/	hanas-u	hanaʃ-imasu	hanas-anai	hanaʃ-ita	‘speak’
/nom/	nom-u	nom-imasu	nom-anai	non-da	‘drink’
/kaer/	kaer-u	kaer-imasu	kaer-anai	kaet-ta	‘return’
/gambar/	gambar-u	gambar-imasu	gambar-anai	gambat-ta	‘hang in there’
/tabe/	tabe-ru	tabe-masu	tabe-nai	tabe-ta	‘eat’
/mise/	mise-ru	mise-masu	mise-nai	mise-ta	‘show’
/mi/	mi-ru	mi-masu	mi-nai	mi-ta	‘see’
/deki/	deki-ru	deki-masu	deki-nai	deki-ta	‘can’

★ What generalizations can we make about allowable non-prevocalic (i.e., syllable-final) Cs in surface forms?

★ Assuming the URs above are correct, is there an MSC (morpheme structure constraint) against non-prevocalic Cs in Japanese?

(38) Here are some recent-ish loanwords (we could also look at very old loans from Chinese):

pɛN	‘pen’
dore̞su	‘dress’
sukuriputo	‘script’

★ What happened here?

(39) Shibatani argues that there was no basis for a V-insertion rule in Japanese before contact with English (or before contact with Chinese?)—but there was a basis for a surface constraint on non-prevocalic Cs.

(40) Mystery: how did the constraint ‘know’ to trigger V-insertion instead of something else?

- (41) Korean. Before Chinese loans came in:
- On the surface, no word-initial liquids → surface constraints $*\#l, *\#r$
 - But also no morpheme-initial liquids underlyingly → we could just as well have MSCs $*\#l, *\#r$
- (42) (Morpheme-internal liquids: $[r]$ intervocalically, $[l]$ elsewhere.)
- (43) These forms don't tell us if it's a surface constraint or an MSC (why not?):

nok	‘green’ < Ch. lok
nam	‘blue’ < Ch. lam
namp ^h u	‘lamp’ < Jp. rampu (Eng. lamp)

- ★ What do these compounds, which use loan stems, tell us about the URs of the loans (assume they are synchronically related)? Which form is obeying $*\#l, *\#r$ —underlying or surface?

no in	‘old man’	tʃo ro	‘premature old age’
nak wɔn	‘paradise’	hjaŋ lak	‘enjoyment’

- (44) Like Japanese, Korean is displaying an ‘extra’ rule here that wasn't needed until these loans came along and that isn't motivated unless there is an SPC (and no MSC).

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