

## Derivational Constraints and Conspiracies

[1]. Ordered rewrite rules are an effective way to formalize sound change and derivational opacity. But other aspects of phonological competence seem better suited to constraint formalism.

[2] limitations on sound inventory and shape:

- Fijian p, t, k vs. English p, t, k, b, d, g.
- how do we deal with the absence of something?
- does it make any sense to say that Fijian could have [b] but does not? Actively reject it?
- This implies that speaker knows about [b]. More generally that typologically the absence of some property is as important as its presence (cf. Principles & Parameters).
- One answer to this question was to follow the structuralists (Trubetzkoy, Bloomfieldians): In English [-voice] and [+voice] contrast and so are unpredictable and hence listed in the lexicon
- but [-voice] in Fijian is redundant; if the lexicon is the repository of unpredictable information, we can represent Fijian /p/ as [0voice] and posit a rewrite rule:  
[-sonorant] -> [-voice]
- Now English and Fijian are formally different; we use rewrite rules.

[3]. Problems with this approach: it doesn't lend itself well to other cases

- Fijian is CV. No CCV, again different from English.
- Do we say every consonant is followed by a vowel ( [0cons] -> [-cons] / [+cons] \_\_\_\_ ) or every vowel is preceded by a consonant ( [0cons] -> [+cons] / \_\_\_\_ [-cons] )? Directionality problems.
- In many cases rules must refer to the redundant information: e.g. stress falls on vowels not on consonants so we must fill in the [0consonantal] for the stress rule to work properly.
- Proposed solution: **Morpheme-Structure Rules**: state generalizations over the lexicon on the shape of words and morphemes before lexical insertion and hence entry into the phonological component.
- But then a "duplication problem" (Kenstowicz & Kisseberth 1976) arises where the same constraint expressing passive limitations on morpheme form (Morpheme-Structure Rules) also plays an active role in shaping the output of rules governing alternations.

[4]. Japanese obstruent voicing (data and analysis from Ito & Mester 1986, 2003)

- Contrast of [voice]: asa 'morning' vs. aza 'bruise'; aka 'red', aga 'fried tofu'
- In Yamato (native) and mimetic vocabulary no voice contrast after nasals: tombo 'dragonfly', kande 'chewing', unzari 'disgusted', kangae 'thought';
- MSR: [-sonorant] -> [+voice] / [+nasal] \_\_\_\_
- controls output of concatenation:

|         |         |        |
|---------|---------|--------|
| tabe-ru | tabe-te | 'eat'  |
| sin-u   | sin-de  | 'die'  |
| yom-u   | yon-de  | 'read' |

- If postnasal voicing in its MSR function applies solely in the lexicon before morpheme combination, then we seem to say the same thing twice: obstruents voice after a nasal in the lexicon and again in the phonological component; how can the same rule be in two different places?
- Alternatively, the rule can be taken out of lexicon and placed in the phonological component; but then it has a "double function" (fills in zeros for tombo and changes contrastive values for -t ≈ -d).
- But now we no longer directly state a generalization that is true of morpheme shapes in the lexicon. What is to prevent a voiceless consonant in this position?
- Yamato Japanese lacks such lexical items--how is this generalization to be expressed?

[5]. Lyman's Law: only one voiced obstruent per morpheme<sup>1</sup>

- o (Yamato, Sino-Japanese vocabulary)

|                  |                     |                   |
|------------------|---------------------|-------------------|
| kak-u<br>'write' | kusa<br>'grass'     | sato<br>'village' |
| kago<br>'basket' | kaze<br>'wind'      | kado<br>'corner'  |
| gake<br>'cliff'  | das-u<br>'take out' | buta<br>'pig'     |
| *gVg             | *dVz                | *bVd              |

- o There is no effective way to express this as a rule filling in zeros. We need a negative constraint on morpheme shape:

\* [+voice] ..... [+voice]

[6]. What about the redundant [0voice] after a nasal?

- o Does it allow a violation of Lyman's Law?
- o Apparently not: \*dombo.
- o Thus it appears that a redundant [+voice] functions the same as a contrastive one for this generalization. Hence we need

|        |               |
|--------|---------------|
| tombo  | * dombo       |
|        |               |
| [+voi] | [+voi] [+voi] |

- o We also require a negative statement of the constraint: \*[+nasal] [-voice]
- o Now the post-nasal voicing sound change in /yom-te/ -> yonde appears to be a way to "satisfy" the constraint.
- o But now we are even further from the goal of a unified statement since we have a constraint \*[nasal] [-voice] and a rule that changes [-voice] to [+voice] after a nasal to evidently satisfy the constraint. But it gets worse.

[7]. Rendaku ("sequential") voicing:

- o first consonant of second element of a compound is voiced (cf. linking morphemes in the compounds of German (Liebe-s-brief), Slavic, Dravidian, West African)

|      |          |           |                      |
|------|----------|-----------|----------------------|
| se   | 'back'   | neko-ze   | 'hunchback'          |
| kaki | 'write'  | yoko-gaki | 'horizontal writing' |
| tosi | 'year'   | hebi-dosi | 'snake year'         |
| sono | 'garden' | hana-zono | 'flower garden'      |

- o Lyman's Law controls output of rendaku, which is blocked in the following:

|      |          |           |               |
|------|----------|-----------|---------------|
| kado | 'corner' | hito-kado | 'first point' |
| sabi | 'rust'   | aka sabi  | 'red rust'    |
| tubo | 'jar'    | tya-tubo  | 'tea jar'     |

<sup>1</sup> According to Tateishi (2003) the English plural morpheme in loans devoices in order to conform with Lyman's Law: cars > kaazu, but Ladies > rediisu

|        |               |              |                      |
|--------|---------------|--------------|----------------------|
| tozi   | 'binding'     | kawa-tozi    | 'leather binding'    |
| kurage | 'jellyfish'   | denki-kurage | 'electric jellyfish' |
| tunagi | 'rosary link' | zyuzu-tunagi | 'tied in a row'      |
| tokage | 'lizard'      | ao-tokage    | 'green lizard'       |

- Here instead of a rule changing a coefficient to conform to a constraint, the constraint blocks the application of a rule.
- We can also ask if the "redundant" [+voice] in an NC cluster will "activate" Lyman's Law.
- The answer is "yes".

kangae 'thought' sirooto-kangae 'layman's idea'

#### [8] conclusion

- rules of sound change can either be blocked (e.g. rendaku) or be activated (post-nasal voicing) to conform to a constraint that also governs "static" generalizations over the lexicon.
- How does one unify these disparate reflections of the post-nasal voicing generalization and Lyman's Law into single grammatical statements?
- OT's answer is to dispense with rules entirely and express all phonological generalizations as constraints.

[9]. Problem of conspiracies: Kisseberth 1970. Notes that \*CCC is avoided at several different points in the phonology of Yokuts Yawelmani:

- no CCC in roots
- no CCC on the surface (accidental product of rules?)
- but several different rules conspire to achieve this effect:

|                   |                                                   |
|-------------------|---------------------------------------------------|
| VC+ChV -> VCCV    | cons deletion                                     |
| CVCC+CV-> CVCiCCV | epenthesis                                        |
| CVCiC+V -> CVCC+V | i-deletion blocked just in case would create *CCC |

- How can we have one formal statement but yet affect the grammar at several different points?
- What is the formal statement?

[10] some more examples of "homogeneity of target, heterogeneity of repair" (McCarthy 2002)

- cross-linguistically this is easy to demonstrate: essentially a typology
- repairs to vowel hiatus: \*VV

truncation: Slavic, Yoruba  
 coalescence: Sanskrit, Tunica  
 devocalization, gliding: Bantu  
 epenthesis: French liaison, Algonquian t-insertion

- repairs to \*NT: a nasal followed by a voiceless consonant (Pater 2000)  
 voicing of obstruent: Japanese  
 deletion of nasal: hand, handy vs. pa[n]t, pa[n]ty (Malecot 1960)  
 coalescence: Austronesian: Nt > n, Nd > nd

11. Lardil (Hale 1972, Prince & Smolensky 2004): language-internal conspiracy

- Minimal Word requirement: all words at least two syllables in length

\* PW (Prosodic Word)  
 |  
 σ (syllable)

- Apocope (deletion of word-final vowel)

|         |            |            |            |
|---------|------------|------------|------------|
| mayar   | mayara-n   | mayara-ɾ   | rainbow    |
| yalul   | yalulu-n   | yalulu-ɾ   | flame      |
| yiliyil | yiliyili-n | yiliyili-ɾ | oyster sp. |

V -> 0 / \_\_\_ #

- Minimal word requirement: apocope rule is blocked in disyllables since if it were to apply the result would be a monosyllable

|      |        |        |          |
|------|--------|--------|----------|
| mela | mela-n | mela-ɾ | sea      |
| wiɽe | wiɽe-n | wiɽe-ɾ | interior |

V -> 0 / VC<sub>0</sub>VC<sub>0</sub>\_\_\_#

- Minimal Word requirement triggers augmentation: addition of final vowel [a] to underlying monosyllabic words

|      |        |        |       |
|------|--------|--------|-------|
| yaka | yak-in | yak-uɾ | fish  |
| ɽera | ɽer-in | ɽer-uɾ | thigh |

cf. disyllables:

|       |          |          |           |
|-------|----------|----------|-----------|
| waɽal | waɽal-in | waɽal-uɾ | boomerang |
| miyaɽ | miyaɽ-in | miyaɽ-uɾ | spear     |

- Grammar with simplest rules should allow the following derivations

|          |         |                |
|----------|---------|----------------|
| / wiɽe / | / yak / |                |
| wiɽ      | -----   | V -> Ø / ___ # |
| wiɽa     | yaka    | Ø -> a / ___ # |

- Some notion of minimal departure from input to satisfy the constraint seems necessary
- Let asterisk denote a change, check denote no change

| / wiɛ / | *[σ] <sub>PW</sub> | Apocope | Epenthesis |
|---------|--------------------|---------|------------|
| wiɛ     | ✓                  | ✓       | ✓          |
| wiɿ     | *                  | *       | ✓          |
| wiɿa    | ✓                  | *       | *          |
| / yak / |                    |         |            |
| yak     | *                  | ✓       | ✓          |
| yaka    | ✓                  | ✓       | *          |

- In the first case *wiɛ* has the fewest violations and so is best
- In the second case *yak* and *yaka* tie so we must prioritize the constraints so that \*[σ]<sub>PW</sub> overrides Epenthesis or assigns a higher penalty

## 12. Tunica (Kisseberth 1971)

- Two different strategies to avoid syllables with successive (clashing) stresses: \*áC<sub>0</sub>á
- Agentive, definite prefix plus stem
 

|           |      |         |         |            |
|-----------|------|---------|---------|------------|
| /tá-hípu/ | hípu | ‘dance’ | tá-hipu | ‘dancer’   |
|           | kúwa | ‘bird’  | tá-kuwa | ‘the bird’ |
- compound
 

|            |                |           |                                     |
|------------|----------------|-----------|-------------------------------------|
| méli       | ‘black’        | nára-méli | black-snake’                        |
| kó-meli    | ‘tree sp.’     |           |                                     |
| tá-ko-méli | ‘the tree sp.’ |           | (Left-to-Right (minimal) iteration) |
- syncope: delete unstressed vowel before ?V; syncope feeds right-destressing
 

|          |            |
|----------|------------|
| hára     | ‘to sing’  |
| ?áki     | ‘3 sg. f.’ |
| hár-?aki |            |

syncope: V -> 0 / \_\_\_ ? V

destress: á -> a / á Co \_\_\_\_ a = any vowel

|           |              |             |                    |
|-----------|--------------|-------------|--------------------|
| /tá-kúwa/ | /tá-kó-méli/ | /hára-?áki/ |                    |
| -----     | -----        | hár-?áki    | syncope            |
| tá-kuwa   | tá-ko-méli   | hár-?aki    | RD (left-to-right) |

- coalescence: V-V contract into a single vowel; here stress clash resolved by retaining right-hand stress and shifting or deleting left-hand stress

|            |             |               |             |
|------------|-------------|---------------|-------------|
| míli       | ‘red’       | áni           | ‘quotative’ |
| mil-éni    | ‘it is red’ |               |             |
| té-mil-éni | <           | /te-míli-áni/ |             |

height ([-high]) from second vowel but [back] from first

|               |                                        |
|---------------|----------------------------------------|
| /míli-áni/    |                                        |
| -----         | RD                                     |
| míléni        | coalescence                            |
| miléni        | LD                                     |
| <br>          |                                        |
| /te-míli-áni/ |                                        |
| -----         | RD                                     |
| te-míléni     | coalescence                            |
| té-miléni     | retraction: a Co á Co á -> á Co a Co á |

- but stress does not shift if it would create a clash; minimal change

/hípu-hk-?úra-áni/ > hípu-hk-?ur-áni 'he was dancing'  
a Co a Co á Co á -> {a, #} Co á Co a Co á

- summary: two different methods for avoiding stress clash: destress on right and destress on left; difference is function of two different derivational stages (or possibly grammatical structure: all example of LD are with quotative *-ani*, which looks like a clitic).

### 13. Ilokano (Hayes & Abbad 1989)

| <u>verb base</u> | <u>derivative</u> | <u>gloss</u>    |
|------------------|-------------------|-----------------|
| tú:lad           | tulá:d-en         | mimic           |
| gá:taŋ           | gata:ŋ-en         | buy             |
| sá:ŋit           | pag-saŋí:t-en     | cry             |
| <br>             |                   |                 |
| masá:he          | masahj-én         | massage         |
| babá:wi          | babawj-én         | regret          |
| sánto            | pag-santw-án      | saint, sanctify |
| <br>             |                   |                 |
| ba:sa            | basá:-?en         | buy             |
| sa:ka            | pag-saká:-?en     | walk barefoot   |
| pjá:             | pag-pja-?én       | make healthy    |

- hiatus repaired by devocalizing first vowel; a low vowel [a] does not have a nonsyllabic counterpart and so alternative repair of glottal insertion is used.
- analysis

[+syll, +stress] -> [+long]/ \_\_\_\_ CV, #

[ +syll, -low] -> [-syll, +high] / \_\_\_\_ V  
0 -> ? / V \_\_ V

- the more general formulation of glottal epenthesis predicts that if there were exceptions to devocalization then they should undergo glottal epenthesis

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