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.

  - 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’;
  - 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.  

- (Yamato, Sino-Japanese vocabulary)
  - kak-u      kusa      sato  
    'write'     'grass'    'village'
  - kago       kaze       kado  
    'basket'    'wind'     'corner'
  - gake       das-u      buta  
    'cliff'    'take out'  'pig'
  - *gVg       *dVz       *bVd

- 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?

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

  - tomb o      * dombo  
    l l l
    [+voi] [+voi] [+voi]

- We also require a negative statement of the constraint: * [+nasal] [-voice]
- Now the post-nasal voicing sound change in /yom-te/ -> yonde appears to be a way to "satisfy" the constraint.
- 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:

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

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

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

---

1 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 -> CVCC+V i-deletion blocked just in case would create *CCC
CVCiC+V -> CVCC+V epenthesis

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 \quad \text{(Prosodic Word)} \\

| \sigma \quad \text{(syllable)} |

- **Apocope (deletion of word-final vowel)**

  - mayar \quad \text{mayara-n} \quad \text{mayara-ʈ} \quad \text{rainbow}
  - yalul \quad \text{yalulu-n} \quad \text{yalulu-ʈ} \quad \text{flame}
  - yiliyil \quad \text{yiliyili-n} \quad \text{yiliyili-ʈ} \quad \text{oyster sp.}

  
  \[ V \rightarrow 0 / \_ \_ \# \]

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

  - mela \quad \text{mela-n} \quad \text{mela-ʈ} \quad \text{sea}
  - wiʈe \quad \text{wiʈ-e-n} \quad \text{wiʈ-e-ʈ} \quad \text{interior}

  \[ V \rightarrow 0 / \text{VC}_n \text{VC}_m \_ \_ \# \]

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

  - yaka \quad \text{yak-in} \quad \text{yak-ʊʈ} \quad \text{fish}
  - ʈera \quad \text{ṭer-in} \quad \text{ṭer-ʊʈ} \quad \text{thigh}

  \text{cf. disyllables:}

  - waŋal \quad \text{waŋal-in} \quad \text{waŋal-ʊʈ} \quad \text{boomerang}
  - miyaʈ \quad \text{miyaʈ-in} \quad \text{miyaʈ-ʊʈ} \quad \text{spear}

- **Grammar with simplest rules should allow the following derivations**

  \[
  / \text{wiʈe} / \quad / \text{yak/} \\
  \quad \text{wiʈ} \quad \text{-------} \quad V \rightarrow \emptyset / \_ \_ \# \\
  \quad \text{wiʈa} \quad \text{yaka} \quad \emptyset \rightarrow \text{a} / \_ \_ \# \]

- Some notion of minimal departure from input to satisfy the constraint seems necessary
- Let asterisk denote a change, check denote no change
<table>
<thead>
<tr>
<th>/wițe/</th>
<th>*[ɔ]pw</th>
<th>Apocope</th>
<th>Epenthesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>wițe</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
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<td>*</td>
<td>*</td>
<td>√</td>
</tr>
<tr>
<td>wița</td>
<td>√</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

/yak/

<table>
<thead>
<tr>
<th>/yak/</th>
<th>/ yaka</th>
</tr>
</thead>
<tbody>
<tr>
<td>yak</td>
<td>*</td>
</tr>
<tr>
<td>yaka</td>
<td>√</td>
</tr>
</tbody>
</table>

- In the first case *wițe* has the fewest violations and so is best
- In the second case *yak* and *yaka* tie so we must prioritize the constraints so that *[ɔ]pw* overrides Epenthesis or assigns a higher penalty

12. Tunica (Kisseberth 1971)
- Two different strategies to avoid syllables with successive (clashing) stresses: *[áC]₀á*
- Agentive, definite prefix plus stem
  /tá-hípu/ hípu ‘dance’ tá-hípu ‘dancer’
  kúwa ‘bird’ tá-kúwa ‘the bird’
- compound méli ‘black’ nára-méli black-snake’
  kó-méli ‘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-?áki

  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-?áki 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-ční ‘it is red’
  té-míli-ční < /te-míli-áni/

  height ([-high]) from second vowel but [back] from first
/míli-áni/
-----------  RD
míléni      coalescence
miléní      LD

/te-míli-áni/
-----------  RD
te-míléni   coalescence
té-miléní   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)

<table>
<thead>
<tr>
<th>verb base</th>
<th>derivative</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>tú:lad</td>
<td>tula:d-en</td>
<td>mimic</td>
</tr>
<tr>
<td>gá:taŋ</td>
<td>gata:ŋ-en</td>
<td>buy</td>
</tr>
<tr>
<td>sá:ŋit</td>
<td>pag-sanj:t-en</td>
<td>cry</td>
</tr>
<tr>
<td>masá:he</td>
<td>masahj-én</td>
<td>massage</td>
</tr>
<tr>
<td>babá:wi</td>
<td>babawj-én</td>
<td>regret</td>
</tr>
<tr>
<td>sánto</td>
<td>pag-santw-án</td>
<td>saint, sanctify</td>
</tr>
<tr>
<td>ba:sa</td>
<td>basá:-?en</td>
<td>buy</td>
</tr>
<tr>
<td>sa:ka</td>
<td>pag-saká:-?en</td>
<td>walk barefoot</td>
</tr>
<tr>
<td>pjá:</td>
<td>pag-pja:-?én</td>
<td>make healthy</td>
</tr>
</tbody>
</table>

• 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, #
\([+\text{syl}, \text{-low}] \rightarrow [-\text{syl}, +\text{high}] / ____ \ V\)

\(0 \rightarrow ? / V ____ \ V\)

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

Selected References


McCarthy, John. 2002. TGOT.

