Consonant Harmony and Reduplication: Parallels and Differences

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1. Preliminaries

(1) **Null Hypothesis:**
Children’s grammars are ‘possible’ grammars (Pinker 1984):
• At every stage of development, children’s grammars abide by the same constraints as do adult grammars.
• While children’s grammars may yield structures which are not present in the target language, these structures must have direct correlates in other adult languages.

(2) **Challenge:**
Consonant Harmony (CH) is commonly attested in early grammars, but is virtually absent from adult grammars (Drachman 1978, Vihman 1978).
(In adult grammars, CH is limited to applying between coronal continuants (Shaw 1991, Gafos 1996).)

(3) **Questions:**
a. Why is CH tolerated in early grammars but absent from adult grammars?
b. Does CH have a correlate in adult grammars?

(4) **Hypothesis for (3b):**
CH **DOES** have correlate in adult grammars:
a. **Operation:** CH and Reduplication both involve melody copy.
b. **Motivation:** CH are reduplication are both driven by positionally-determined constraints on licensing (CH: Prosodic; Reduplication: Morphological).

(5) **Positional Licensing:**

<table>
<thead>
<tr>
<th></th>
<th>Weak Licensers</th>
<th>Strong Licensers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosodic</td>
<td>Codas</td>
<td>Foot-edge Onsets</td>
</tr>
<tr>
<td></td>
<td>Foot-internal Onsets</td>
<td></td>
</tr>
<tr>
<td>Morphological</td>
<td>Affixes</td>
<td>Roots</td>
</tr>
</tbody>
</table>
2. Consonant Harmony

(6) **Description:** A process where consonants which are not string-adjacent assimilate to one another, usually in place features; vowels of any quality can intervene
- Coronals are virtually always targets
- Right-to-left more pervasive than left-to-right

(for generalizations, see e.g. Smith 1973, Menn 1976, Cruttenden 1978, Vihman 1978, Stemberger & Stoel-Gammon 1991)

(7) **Right-to-left Velar Harmony:** Amahl Stages 1-14 (2;2-2;8) (Smith 1973):

‘dog’ [gOg]  ‘donkey’ [gOki.]
‘duck’ [gøk]  ‘desk’ [gEk]
‘snake’ [Neik]  ‘sock’ [gOk]
‘taxi’ [goægi.].  ‘thing’ [giN]

(8) **Standard Analysis of CH:**

(9) **Locality Problem:** CH skips vowels of any quality

‘duck’ → [gøk]  * d→g  ø  k
0 g  g
       g  g

Dor  Dor

a. **Solution 1:** Child language has CV planar segregation (McDonough & Myers 1991, Macken 1992):

Dor

```
  g
  d→g  ø  k
  g

Dor
```

b. **Empirical Problems for Solution 1:**
- Velar CH (7) is productive in Amahl’s grammar when planar segregation is no longer motivated (Goad 1997; see also Levelt 1994 on Dutch), i.e. when order of C and V in a morpheme is no longer predictable (as per McCarthy’s 1989 criteria)
- Adult languages with planar segregation do not exhibit CH

c. **Solution 2:** Adopt Clements–Hume 1995 type geometry (partial segregation):

```
d→g  ø  k
  g  g  g
  C-Pl  C-Pl  C-Pl
  g  g  g
  7  V-Pl  g
  0  g  g
       g
Dor  Dor
```

d. **Empirical Problem for Solution 2:**
Predicts unrestricted CH in adult languages (cf. (2))
(10) **Solution:**
CH involves **MELODY COPY** (Goad 1997), forced by licensing constraints (Goad 2000, Rose 2000).

<table>
<thead>
<tr>
<th>Coda:</th>
<th>Foot-internal Onset:</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘dog’ → [gOg]</td>
<td>‘donkey’ → [gOki.]</td>
</tr>
</tbody>
</table>

| **Input** (simplified): d o g | **Input** (simplified): d 0 k i... |
| Cor | g | g | g | Cor | g | g | g | g |
| Lab | g | g | g | Dor |

| **Output:** | **Output:** |
| g | 0 | g | g | g | g | g | g |
| Coda /g/ can’t license Dor | Foot-internal /k/ can’t license Dor |
| g | g | g | g | g | g | g | g |
| Lab | Dor |

(On the link between harmony and licensing in adult languages, see Steriade 1995:§3, Beckman 1997, Piggott 1997, 2000.)

(11) **Codas and Foot-Internal Onsets as Weak Licensors in Adult Languages:**

a. **Japanese** Coda-Onset place sharing (Itô 1986):

i. **kampai** *kanpai* ‘cheers’
**haNko** *hamko* ‘seal’
**kappa** *katpa* ‘legendary being’

ii. **sekkem** ‘soap’

ha Nk o *h a m k o

| 8 g | g | g |
| Dor | Lab Dor |

b. **English** Flapping (e.g. Harris 1997):

/t/ (cf[|][y]Ft vs. bou[t][ti][que]Ft
/d/ (lá[|][er]Ft re([d][j][e][em]Ft

(12) **Generalizations for CH:**

<table>
<thead>
<tr>
<th><strong>Operation:</strong></th>
<th><strong>Explanation:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronals are virtually always targets</td>
<td>Dorsal and Labial must ‘move’ to strong positions to be licensed</td>
</tr>
<tr>
<td>Right-to-left more pervasive than left-to-right</td>
<td>Rightmost C is weak licenser: coda (CVC) or foot-internal onset (CV.CV)</td>
</tr>
<tr>
<td>Reduplication involves melody copy, not spreading</td>
<td>Spreading violates Locality</td>
</tr>
</tbody>
</table>
3. Reduplication

(13) **Description:** A process where a string of segments acquires all segmental content from another string of segments

- Reduplicants are affixes; bases are roots/stems.
- Prefixal reduplication more pervasive than suffixal reduplication.
- Reduplicative ‘templates’ are defined prosodically.

(for X-ling generalizations, see Moravcsik 1978, Marantz 1982, McCarthy & Prince 1986)

(14) **Mokilese** (McCarthy & Prince 1986; originally from Harrison 1976):

- pO독 pO독-pO독 ‘plant’ – ‘progressive+plant’
- poki pok-poki ‘beat’
- pilO독 pil-pilO독 ‘pick breadfruit’

(15) **Standard Analysis of Reduplication:**

a. **Locality:** Reduplication cannot involve spreading

* C V C – C V C V C

\[
\begin{array}{ccccccc}
0 & 0 & 0 & g & g & g & g \\
0 & 0 & \emptyset & g & g & g & g \\
0 & \emptyset & \emptyset & g & g & g & g \\
p & 0 & d & 0 & k
\end{array}
\]

b. Reduplication must involve **MELODY COPY** (Marantz 1982, McCarthy & Prince 1986)

\[
\begin{array}{cccccccc}
C & V & C & – & C & V & C & V & C \\
g & g & g & g & g & g & g & g & g \\
p & 0 & d & 0 & d & 0 & k
\end{array}
\]

(16) **Affixes as Weak Licensers in Adult Languages:**

a. **Vowel Harmony:** Vowels in affixes cannot license certain features

- **Akan** [atr] harmony (Clements 1976)

b. **Total Vowel Assimilation:** Vowels in affixes cannot license any features

- **Klamath** causative prefix (Barker 1964):
  - [sninkl][k’a] ‘makes dusty’
  - [snel’edhlem’a] ‘makes someone dizzy’
  - [sna-batgal] ‘gets someone up from bed’
  - [sno-bolgtji] ‘causes something to turn black’

b. **Reduced Consonant Inventory:** Consonants in affixes are limited to unmarked place

- **Chilcotin** (Athapaskan) prefixes are coronal or [h,/] only (data from Krauss 1975):
  - [dE-toe-l-gwUs] ‘he will cough’
  - [h’s-Gw’s] ‘I am ticklish’
  - [næ-sE-s-k’æz] ‘I am stiff again’
d. Reduplication: No segments in affixes can license any features

Mokilese:

\[ \begin{array}{ccc}
  \text{Af} & \text{Root} \\
  \text{C} & \text{V} & \text{C} & \text{C} & \text{V} & \text{C} \\
  g & g & g & g & g & g \\
  p_i & o_j & d_k & p_i & o_j & d_k & o & k \\
\end{array} \]

4. Parallels

(17) CH has Correlate in Adult Grammars (from (4)):
   a. Operation: CH and Reduplication both involve melody copy.
   b. Motivation: CH are reduplication are both driven by positionally-determined constraints on licensing (CH: Prosodic, Reduplication: Morphological).

(18) Summary:

\begin{center}
\begin{tabular}{|l|l|l|}
\hline
 \textbf{PROSODICALLY WEAK} & \textbf{MORPHOLOGICALLY WEAK} & \textbf{g} \\
\hline
\textbf{Problem \Rightarrow} & Place in (wd-internal) coda (e.g. Japanese) & Place in coda and fr-internal onset (Child CH) & Affixes (Adult Reduplication) \\
\hline
\textbf{Resolution \Rightarrow} & Place sharing with strong licenser (=following onset) & Feature copy to enable licensing by strong licenser (=foot-edge onset in CH; root in reduplication) & \\
\hline
\end{tabular}
\end{center}

(19) What about intervening vowels?

a. Irrelevance of the intervening vowel:

\[
\begin{array}{c}
  [g\ E\ k] \quad \text{‘desk’} \\
  \uparrow \\

  [g\ \phi\ k] \quad \text{‘duck’} \\
  \uparrow \\

  [g\ O\ k] \quad \text{‘sock’} \\
  \uparrow \\
\end{array}
\]

(cf. earlier ‘child reduplication’ stage, e.g. ‘bottle’ → [baba])

b. Vowel Prespecification in Adult Reduplication:
   i. Yoruba (from Marantz 1982):
      \[
      \begin{array}{l}
      \text{li-}lq\text{C} \quad *lq\text{C}lq\text{C} \quad \text{‘go’ (nominalized)} \\
      \text{di-}dun \quad *dun-dun \quad \text{‘to be tasty, sweet’ (nominalized)}
      \end{array}
      \]
      \[
      \begin{array}{l}
      \text{si-se/} \quad *\text{se-se/} \quad \text{‘say’ (iter)} \\
      \text{bi-bar} \quad *\text{ba-bar} \quad \text{‘cover’ (iter)} \\
      \text{sU-sQ/} \quad *\text{sU-sQ/} \quad \text{‘light’ (iter)} \quad ([i] undergoes Round and Atr Harmonies)
      \end{array}
      \]

(20) What about morphology?

a. If CH parallels adult reduplication, why does /dOg/ → [gOg] and not [dO-dOg] or [di-dOg]?
b. Hypothesis:
Early grammars lack productive affixation; CH characterizes the ‘one-word’ stage, at the point where the only productive morphology (in English-type languages) is compounding (and perhaps diminutives; cf. Goad 1996 for an alternative explanation of such forms)

(21) What about the fact that reduplicative ‘templates’ are defined prosodically?

a. If CH parallels adult reduplication, how do we prevent ‘dog’ → *[dOdOg] and ‘donkey’ → *[dOdOk], even in the absence of productive affixation?

\[ \begin{align*}
\sigma & \sigma \\
3g & 3g & 3g & 3g \\
d & 0 & d & 0 & g & d & 0 & d & 0 & k & i
\end{align*} \]

b. Hypothesis:
Without productive affixation, child reduplication must be driven by prosodic considerations. In English-type languages, where feet are left-headed, there is nothing to be gained by reduplication of this type (cf. French below).

5. Prosodically-motivated Reduplication in Early French

(22) French Child at 1;8 (Roussey 1899, via Ingram 1974):

<table>
<thead>
<tr>
<th>Target Output</th>
<th>Child’s Output</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pot</td>
<td>[po]</td>
<td>[pO]pO</td>
</tr>
<tr>
<td>joue</td>
<td>[Zu]</td>
<td>[tutu]</td>
</tr>
<tr>
<td>nez</td>
<td>[ne]</td>
<td>[ne@ne@]</td>
</tr>
<tr>
<td>b. dame</td>
<td>[dam]</td>
<td>[dadap]</td>
</tr>
<tr>
<td>soupe</td>
<td>[sup]</td>
<td>[tutup]</td>
</tr>
<tr>
<td>balle</td>
<td>[bal]</td>
<td>[babab]</td>
</tr>
<tr>
<td>c. livre</td>
<td>[livr]</td>
<td>[dj¸@dj¸@]</td>
</tr>
</tbody>
</table>

- Codas are not weight-bearing; there are no long vowels
- Final consonants are onsets of empty-headed syllables

French Foot Structure (Charette 1991):
- Build a single right-headed foot at the right word edge
- Empty nuclei cannot head feet
- Respect foot binarity whenever possible (σσ)
Without overt determiners, all target outputs in (22) violate Foot Binarity: Augmentation yields well-formed Foot:

a. \[ [po] \rightarrow [pOpO] \]

\[
\begin{array}{c|c|c}
\text{PWd} & \text{PWd} & \text{Ft} \\
\hline
 g & g & \\
\sigma & \sigma & \\
2 g & 2 g & 2 g \\
p & p & 0 & p & 0
\end{array}
\]

b. \[ [dam] \rightarrow [dadap] \]

c. \[ [dam] \]

(25) Problems with (24c) –bimoraic syllable option– for French:
- Goad & Brannen (in press): Children’s first word-final consonants are syllabified as onsets of empty-headed syllables; this reflects the unmarked case.
- There is no positive evidence to lead the child to conclude that final consonants are moraic, let alone codas, in French (cf. English).
References


