Child Phonology Conference 2001 27-28 April 2001
Boston, MA

Consonant Harmony and Reduplication: Parallels and Differences

Heather Goad
McGill University
hgoad@po-box.mcgill.ca

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:**

	Weak Licensers	**Strong Licensers**
Prosodic	Codas Foot-internal Onsets	Foot-edge Onsets
Morphological	Affixes	Roots

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

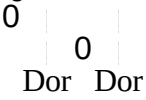
(for generalizations, see e.g. Smith 1973, Menn 1976, Cruttenden 1978, Vihman 1978, Stemberger & Stoel-Gammon 1991)

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

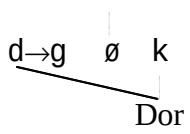
'dog'	[gɔg]	'donkey'	[gɔkiˌ]
'duck'	[gøk]	'desk'	[gɛk]
'snake'	[neik]	'sock'	[gɔk]
'taxi'	[gœgiˌ]	'thing'	[giŋ]

(8) **Standard Analysis of CH:**
CH involves SPREADING (Menn 1978, Spencer 1986, Stemberger & Stoel-Gammon 1991, McDonough & Myers 1991, Macken 1992, Dinnsen, Barlow & Morrisette 1997)

(9) **Locality Problem:** CH skips vowels of any quality
'duck' → [gøk] * d→g ø k

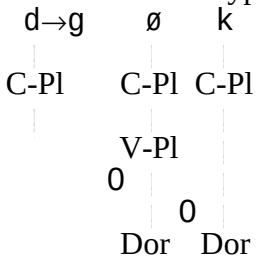


a. **Solution 1:** Child language has CV planar segregation (McDonough & Myers 1991, Macken 1992):



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. **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).

Coda: 'dog' → [gOg]				**Foot-internal Onset:** 'donkey' → [gOki..]				
Input (simplified):	d	O	g	**Input** (simplified):	d	O	k	i..
	Cor	Lab	Dor		Cor	Lab	Dor	Cor
Output: Coda /g/ can't license Dor	g	O	g	**Output:** Foot-internal /k/ can't license Dor	g	O	k	i..
	Dor_i	Lab	Dor_i		Dor_i	Lab	Dor_i	Cor

(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 Licensers in Adult Languages:**

a. Codas cannot license their own melodic content

Japanese Coda-Onset place sharing (Itô 1986):

i.	ka**m**pai	*kanpai	'cheers'
	ha**N**ko	*hamko	'seal'
	ka**p**pa	*katpa	'legendary being'
ii.	sekke**n**	*sekkem	'soap'

h a N k o *h a m k o
8
Dor Lab Dor

b. Foot-internal onsets are subject to neutralization

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

/t/	$(cí[\,]y)_{Ft}$	vs.	$bou([t]ique)_{Ft}$
/d/	$(lá[\,]er)_{Ft}$		$re([d]éem)_{Ft}$

(12) **Generalizations for CH:**

Operation:	**Explanation:**
Coronals are virtually always targets	Dorsal and Labial must 'move' to strong positions to be licensed
Right-to-left more pervasive than left-to-right	Rightmost C is weak licenser: coda (CVC) or foot-internal onset (CVCV)
Reduplication involves melody copy, not spreading	Spreading violates Locality

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.

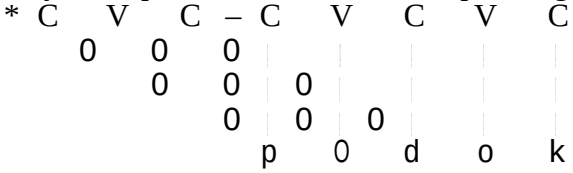
(for X-ling generalizations, see Moravcsik 1978, Marantz 1982, MCarthy & Prince 1986)

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

p0dok	p0d-p0dok	'plant' – 'progressive+plant'
poki	pok-poki	'beat'
pil0d	pil-pil0d	'pick breadfruit'

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

a. Locality: Reduplication cannot involve spreading



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

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

a. Vowel Harmony: Vowels in affixes cannot licence certain features

Akan [atr] harmony (Clements 1976)

[+atr] root:	[-atr] root:
/O-kusi-E/ → [o-kusi-e] 'rat'	/O-k0dI-E/ → [0-k0dI-E] 'eagle'

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

Klamath causative prefix (Barker 1964):

[sn**i**-nklilk'a]	'makes dusty'
[sn**e**-l'e͡mlem'a]	'makes someone dizzy'
[sn**a**-batgal]	'gets someone up from bed'
[sn**o**-bo͡lstgi]	'causes something to turn black'

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

Chilcotin (Athapaskan) prefixes are coronal or [h,/] only (data from Krauss 1975):

[dE-tœ-l-qʷUs]	'he will cough'
[h´-s-Gʷ´s]	'I am ticklish'
[nœ-sE-s-k'œz]	'I am stiff again'

d. Reduplication: No segments in affixes can license any features

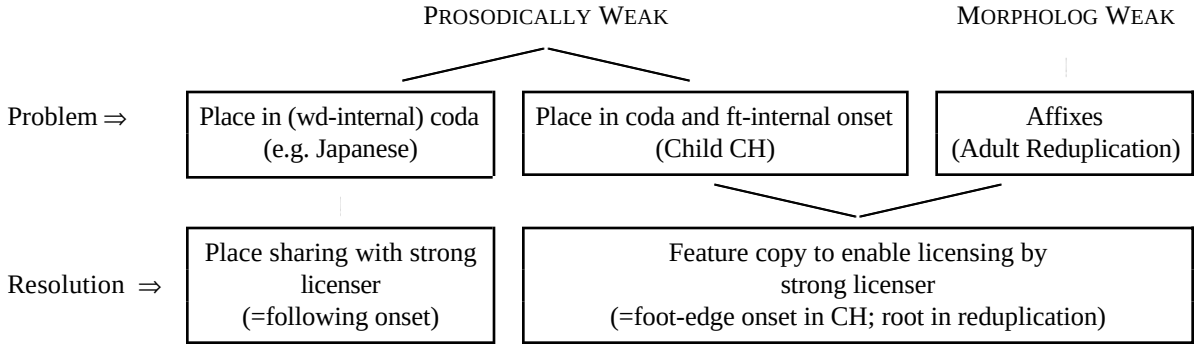
Mokilese:

[C	V	C]$_{Af}$	–	[C	V	C	V	C]$_{Root}$
p_i	0_j	d_k		p_i	0_j	d_k	o	k

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:**



(19) **What about intervening vowels?**

a. Irrelevance of the intervening vowel:

[g E k]	'desk'	[g ø k]	'duck'	[g 0 k]	'sock'
↑__|		↑__|		↑__|	

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

b. Vowel Prespecification in Adult Reduplication:

i. **Yoruba** (from Marantz 1982):

l**i**-lo¢	*lo¢lo¢	'to go' (nominalized)
d**i**-dun	*du-dun	'to be tasty, sweet' (nominalized)

ii. **Akan** (from Marantz 1982, McCarthy &Prince 1986):

s**i**-se/	*se-se/	'say' (iter)	
b**i**-bar	*ba-bar	'cover' (iter)	
s**U**-s0/	*sU-s0/	'light' (iter)	([i] undergoes Round and Atr Harmonies)

(20) **What about morphology?**

a. If CH parallels adult reduplication, why does /d0g/ → [g0g] and not [d0-d0g] or [di-d0g]?

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' → *[d0d0g] and 'donkey' → *[d0d0ki], even in the absence of productive affixation?

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):

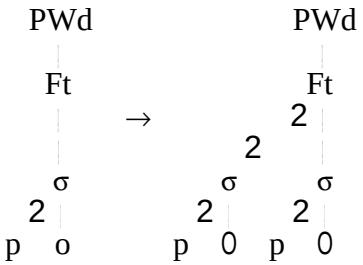
	Target Output:		Child's Output:	Gloss:
a.	pot	[po]	[p0p0]	'pot'
	joue	[Zu]	[tutu]	'play'
	nez	[ne]	[nen@]@	'nose'
b.	dame	[dam]	[dadap]	'lady'
	soupe	[sup]	[tutup]	'soup'
	balle	[bal]	[babab]	'ball'
c.	livre	[livr]	[dj,@]@	'book'

(23) **French Syllable Structure** (Charette 1991, Dell 1995):
- Codas are not weight-bearing; there are no long vowels
- Final consonants are onsets of empty-headed syllables

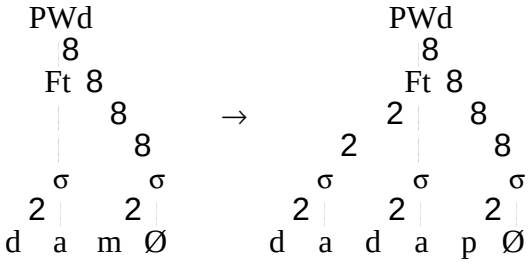
French Foot Structure (Charette 1991):
- Build a single right-headed foot at the right word edge
- Empty nuclei cannot head feet
- Respect foot binarity whenever possible (σσ)

(24) **Without overt determiners, all target outputs in (22) violate Foot Binarity:** Augmentation yields well-formed Foot:

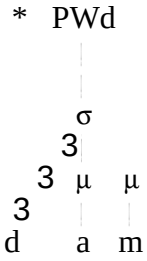
a. [po] → [p0p0]



b. [dam] → [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

Barker, M.A.R. (1964) *Klamath grammar.* Berkeley and Los Angeles: University of California Press.

Beckman, J. (1997) Positional faithfulness, positional neutralisation and Shona vowel harmony. *Ph* 14: 1-46.

Charette, M. (1991) *Conditions on phonological government.* Cambridge: CUP.

Clements, G.N. (1976) Vowel harmony in nonlinear generative phonology. IULC.

Clements, G.N. & E. Hume (1995) The internal organization of speech sounds. In J. Goldsmith (ed) *The handbook of phonological theory.* Blackwell, pp. 245-306.

Cruttenden, A. (1978) Assimilation in child language and elsewhere. *JCL* 5:373-378.

Dell, F. (1995) Consonant clusters and phonological syllables in French. *Lingua* 95: 5-26.

Dinnsen, Daniel, Jessica Barlow & Michelle Morrisette (1997) Long-distance place assimilation with an interacting error pattern in phonological acquisition. *Clinical Linguistics & Phonetics* 11: 319-338.

Gafos, D. (1996) *The articulatory basis of locality in phonology.* PhD thesis, Johns Hopkins University.

Goad, H. (1996) Codas, word minimality, and empty-headed syllables. *Child Language Research Forum* 28: 113-122

Goad, H. (1997) Consonant harmony in child language: An optimality-theoretic account. In S.J. Hannahs & M. Young-Scholten (eds) *Focus on phonological acquisition.* Benjamins, pp. 113-142.

Goad, H. (2000) Assimilation phenomena and initial constraint ranking in early grammars. Paper delivered at the BU Conference on Language Development, November.

Goad, H. & K. Brannen (in press) Phonetic evidence for phonological structure in syllabification. In J. van de Weijer (ed) *Issues in the phonetics-phonology interface.* Amsterdam: John Benjamins.

Harris, J. (1997) Licensing inheritance: An integrated theory of neutralisation. *Ph* 14: 315-370.

Harrison, S. (1976) *Mokilese reference grammar.* Univ of Hawaii Press.

Ingram, D. (1974) Phonological rules in young children. *JCL* 1: 49-64.

Itô, J. (1986) *Syllable theory in prosodic phonology.* PhD thesis, University of Massachusetts Amherst.

Krauss, M.E. (1975) Chilcotin phonology, a descriptive and historical report. Ms., University of Alaska.

Levelt, C. (1994) *On the acquisition of place.* PhD thesis, Leiden University.

Macken, M. (1992) Where's phonology? In C. Ferguson, L. Menn & C. Stoel-Gammon (eds) *Phonological development: Models, research, implications.* Timonium, Maryland: York Press, pp. 249-269.

Marantz, A. (1982) Re reduplication. *LI* 13: 483-545.

McCarthy, J. & A. Prince (1986) Prosodic morphology. Ms., University of Massachusetts Amherst & Brandeis.

McCarthy, J. (1989) Linear order in phonological representation. *LI* 20: 71-99.

McDonough, J. & S. Myers (1991) Consonant harmony and planar segregation in child language. Ms., UCLA and University of Texas Austin.

Menn, L. (1976) *Pattern, control and contrast in beginning speech: A case study in the development of word form and word function.* PhD trhesis, University of Illinois, Urbana-Champaign.

Menn, L. (1978) Phonological units in beginning speech. In A. Bell & J.B. Hooper (eds) *Syllables and segments.* Amsterdam: North-Holland, pp. 157-171.

Moravcsik, E. (1978) Reduplicative constructions. In J.H. Greenberg (ed) *Universals of human language, vol. 3: Word structure.* Stanford University Press.

Piggott, G.L. (1997) Licensing and alignment. *Ph* 15: 437-477.

Piggott, G.L. (2000) Against featural alignment. *JL* 36: 85-129.

Pinker, S. (1984) *Language learnability and language development.* Harvard University Press.

Rose, Y. (2000) *Headedness and prosodic licensing in the L1 acquisition of phonology.* PhD Thesis, McGill Univ.

Roussey, C. (1899). Notes sur l'apprentissage de la parole chez un enfant. *La parole* 1: 870-880.

Shaw, P.A. (1991) Consonant harmony systems. In C. Paradis & J.-F. Prunet (eds) *The special status of coronals.*

Smith, N.V. (1973) *The acquisition of phonology: A case study.* CUP.

Spencer, A. (1986) Towards a theory of phonological development. *Lingua* 68: 3-38.

Stemberger, J. & C. Stoel-Gammon (1991) The underspecification of coronals: Evidence from language acquisition and performance errors. In C. Paradis & J.-F. Prunet (eds) *The special status of coronals.* Academic Press.

Steriade, D. (1995) Underspecification and markedness. In J. Goldsmith (ed) *The handbook of phonological theory.* Blackwell, pp. 114-174.

Vihman, M.M. (1978) Consonant harmony: Its scope and function in child language. In J.H. Greenberg (ed), *Universals of human language, Vol. 2: Phonology.* Stanford University Press, pp. 281-334.