

## (Non-)Adjacency in Harmony Systems

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### 1. Introduction

*What do we mean when we characterize something as non-local in phonology?*

#### Question to be addressed here:

Which aspects of harmony patterns can be generated without reference to structure beyond adjacent elements, and which require information about non-adjacent elements?

#### Goals of this talk:

- Become more precise about the concepts of locality and non-locality.
  - Empirical focus: Vowel harmony
  - Develop a typology of adjacent and non-adjacent interactions in harmony in relation to the following:
    - §2 Target scope
      - Ascrea versus Buchan Scots
    - §3 Locality of assimilation
      - Ascrea versus Central Veneto
    - §4 Myopia
      - Tuvan versus Central Veneto
  - Bring these findings to bear on current theoretical proposals concerning locality of dependencies, the harmony imperative, and the framework architecture.
  - Assess consequences; identify directions for future progress.
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### 2. Target Scope

- In some systems, the scope for identifying a possible target is restricted to adjacent elements; in others, it can extend to non-adjacent elements.
  - Adjacent elements may be segments, or, in the case of vowel harmony, syllables. However, this distinction is likely artificial, as vowels in adjacent syllables have contiguous articulations (e.g. Gafos 1999).
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#### 2.1 Adjacent targets only: Buchan Scots (Paster 2004)

- (1) Buchan Scots height harmony:
- A high unstressed front vowel assimilates in height to a preceding stressed non-high vowel.

(2) Height harmony targets high unstressed /i/. Compare suffix alternations:

a.	hér-e	‘hairy’	b.	míl-i	‘mealie’
	hól-e	‘hilly		bík-i	‘beakie’
	hárt-e	‘hurtie’		dír-i	‘dearie’
	póst-e	‘postie’		snút-i	‘snooty’
	rók-e	‘rocky’		hús-i	‘housie’
	mán-e	‘mannie’			

(3) Only vowels that are adjacent to the stressed syllable undergo harmony. (Paster suggests the domain of harmony is restricted to a trochaic foot.)

báltər-i	‘buttery’
snǝkər-i	‘snickery’

(4) Summary: Buchan Scots

- Buchan Scots height harmony targets unstressed high front vowels.
- The target must be in an adjacent syllable.

## 2.2 Non-adjacent targets possible: Ascrea (Romance) (Fanti 1938-1940)

(5) Ascrea vowels: /i, e, ε, a, ɔ, o u/

(6) Ascrea height harmony:

- Stressed /e, o/ raise to [i, u] and /ε, ɔ/ raise to [e, o] preceding a high suffix vowel.
- Raising can occur across an intervening unstressed vowel which does not raise.

(7) Height harmony targets only non-low vowels. Compare (a-b) versus (c). Targets may occur in a non-adjacent syllable (bolded exx. in (a-b)).

a.	/e/, /o/ → [i], [u]			
	metésse	metíjfi		‘reap’ (1sg/2sg impf. subj.)
	sórda	súrdu		‘deaf’ (f sg/m sg)
	tóreɹa	<b>túreuu</b>	<b>*túriuu</b>	‘cloudy’ (f sg/m sg)
b.	/ε/, /ɔ/ → [e], [o]			
	βélle	βélli		‘beautiful’ (f pl/m pl)
	kapóto	kapóti		‘overturn’ (1sg/2sg pres. ind.)
	mórtse	<b>mórtseru</b>	<b>*mórtsiru</b>	‘died’ (3sg/3pl)
c.	Low vowels do not raise			
	mánno	mánni		‘send’ (1sg/2sg impf. subj.)
	sállu	sállu		‘climb’ (1sg/3pl pres. ind.)

(8) Summary: Ascrea

- Ascrea height harmony targets stressed non-low vowels.
- Target can be in a non-adjacent syllable.

### 2.3 Theoretical issue: Target scope

- Is the scope for identifying a possible target restricted to adjacent elements or can it extend to non-adjacent elements?

#### (9) Target scope in Buchan Scots: Adjacent

- Compatible with a target scope where only the **adjacent** syllable is visible.

#### (10) Harmony from $\sigma_1$ to $\sigma_2$

/hʌrt-i/ → hʌrt-e

#### b. No harmony from $\sigma_1$ to $\sigma_3$

/bʌtər-i/ → bʌtər-i

- **Upshot:** In [bʌtər-i] the final high vowel does not undergo harmony, because it is not adjacent to a syllable with a stressed non-high vowel. Intervening unstressed non-high vowels thus block harmony.

#### (11) Target scope in Ascrea: Non-adjacent

- The target scope must have the capacity to extend beyond the adjacent syllable.

#### (12) Height harmony from $\sigma_3$ to $\sigma_1$ involves non-adjacent syllables

/toɾeɹ-u/ → túɾeɹu

- Not compatible with analysis involving a succession of adjacent syllable windows because the intervening vowel does not present the harmonizing height feature, and the glide [ɹ] does not trigger harmony, as evidenced by [tóɾeɹuə].

#### (13) Locality of assimilation?

- Could target scope be consistently global in a word and the contrast obtained using a parameter setting or violable constraint on locality of assimilation?
  - Some examples: \*SKIP( $\sigma$ ) (for autosegmental associations) (Uffmann 2004), EXPRESSION (for Harmony Domains theory) (Cole & Kisseberth 1995), PROXIMITY (for harmony by correspondence) (Rose & Walker 2004), ASSOCIATEHEAD (for Span theory) (O'Keefe 2006).

#### Problems:

- Not clear why local assimilation for [-high] could not nevertheless proceed through intervening [ə] in Buchan Scots.
- Will not succeed when we consider Central Veneto harmony, whose target scope can be non-adjacent but whose assimilation proceeds only through adjacent syllables.

### 3. Locality of Assimilation

- In systems where a non-adjacent target is possible, harmonies may differ with respect to whether assimilation must proceed through adjacent elements or not.
- In Ascrea (§2) target scope must include non-adjacent syllables and the resulting assimilation can skip an intervening syllable (*túreu*).
- In Central Veneto, target scope must likewise include non-adjacent syllables, but the resulting assimilation cannot skip an intervening vowel.

#### 3.1 Adjacent assimilation only: Central Veneto (Romance) (Walker 2005, 2009)

(14) Central Veneto vowels: /i, e, ε, a, ɔ, o, u/; in ō: [i, e, a, o, u]

(15) Central Veneto height harmony:

- Stressed /e, o/ raise to [i, u] preceding a high vowel.
- Intervening unstressed /e, o/ can raise, but only if the stressed vowel raises.

(16) Height harmony affects only /e/ and /o/. Compare (a) versus (b).<sup>1</sup>

a. /e/, /o/ → [i], [u]

kant-é-se	kant- <u>í</u> -si-mo	‘sing’ (1sg/1pl impf. subj.)
botón	bot <u>ú</u> n-i	‘button’ (m sg/pl)

b. /ε/, /ɔ/, /a/ do not raise.

vétj-i	‘old man’ (m pl)
tók-i	‘piece’ (m pl)
gát-i	‘cat’ (m pl)

(17) In forms with antepenultimate stress where the antepenult contains a possible target vowel, the penult contains a mid vowel, and the ultima contains a high vowel, then vowels in the penult and antepenult raise (a). Otherwise a mid unstressed penult does not raise (b).

a. Raising of mid vowels in the stressed antepenult and unstressed penult.

órden-o	<u>ú</u> rdin-i	‘order’ (1sg/2sg)
	*úrdeni <sup>2</sup>	

<sup>1</sup> The trigger vowel in these examples is /i/. Central Veneto lacks /u/ in its inflectional system, and no data were found where /u/ occurred in a stem in a context to trigger harmony. However, given that /u/ can trigger metaphonic raising in certain other Romance languages, it is reasonable (but not crucial) to generalize that triggers are high vowels.

<sup>2</sup> Some speakers show no raising in a form like [órden-i] where trigger and target are in non-adjacent syllables, pointing to a restriction on target scope to adjacent syllables. The same type of pattern shown in (17a-b) is attested in Grado, but without report of variability among speakers, e.g. [zóven-e]/[zúvin-i] ‘young man’ (sg/pl); [bodzánteni] ‘crab right before it becomes without a shell’ (m pl) (Cortelazzo 1978).

- b. No viable target in stressed antepenult; no raising of mid penult.<sup>3</sup>

pérseg-o	<b>pérseg-i</b>	‘peach (fruit)’ (m sg/pl)
	*pérsig-i	
ángol-o	ángol-i	‘angle’ (m sg/pl)
	*ángul-i	

- (18) An intervening low vowel blocks harmony.

la(v)ór-a-v-a	<b>la(v)ór-a-v-i</b>	‘worked, was working’ (1sg/2sg impf. ind.)
	*la(v)úr-a-v-i	

- (19) Summary: Central Veneto

- Central Veneto height harmony targets stressed /e/ and /o/.
- Like Ascrea, targets can be in a non-adjacent syllable.
- Unlike Ascrea, assimilation must proceed through adjacent syllables. Thus an intervening unstressed vowel cannot be skipped in the product of harmony. (Compare C. Veneto [úrdin-i] with Ascrea [túreuu].)
- Low vowels block harmony.

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- (20) **Formal issues:**

- Local assimilation versus locality of target scope.
  - Harmony targets.
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### 3.2 Local assimilation

- (21) Central Veneto teases apart two types of (non-)adjacency in harmony:

- **The target scope includes non-adjacent syllables.** That is, whether harmony occurs can depend on information contained in non-adjacent syllables. Compare:

a. Harmony occurs when *é* or *ó* is sighted, even at a distance  
 ó • e • i      →      ú • i • i      *úrdini*

b. No harmony occurs if the stressed syllable does not contain *e* or *o*  
 é • e • i      →      é • e • i      \*é • i • i      *pérsegi*

- **Assimilation must proceed through adjacent syllables.** A target will only undergo harmony if any intervening syllables also undergo the assimilation.

c. Even if *é* or *ó* is sighted, no harmony occurs if non-undergoer /a/ intervenes:  
 ó • a • i      →      ó • a • i      \*ú • a • i      *la(v)óravi*

- An intervening unstressed mid vowel undergoes raising in harmony *not because it is a target* (as evidenced by (21b)), but rather because assimilation must proceed through adjacent syllables and it occurs on the path *between* the trigger and target.

<sup>3</sup> The failure of the unstressed vowels to raise in (17b) cannot be due to a general prohibition on unstressed high vowels after *é*, *ó*, *á*. Consider forms like: [ezérsit-i] ‘army’ (m pl), [návig-o] ‘navigate’ (1sg).

(22) **Non-adjacent target scope**

- Central Veneto reveals that a violable constraint that restricts assimilation to adjacent elements cannot be the source of adjacent vs. non-adjacent target scope.
- Global evaluation, as in classic OT, can obtain non-adjacent target scope, as demonstrated in what follows.

(23) Central Veneto: Analysis of harmony imperative as indirect licensing

- Marked structure in a weak position must be licensed by membership in a strong position (Steriade 1995, Walker 2005, see also Itô 1988, Goldsmith 1990, Lombardi 1994).

(24) LICENSE([+high]<sub>post-tonic</sub>/σ)

Penalizes a [+high] feature specification in a post-tonic syllable that is not also associated with a stressed syllable (Walker 2005).

(25) **Core ranking:**

*Licensing causes vowel raising*

IDENT(ATR) >> LICENSE([+high]<sub>post-tonic</sub>/σ) >> IDENT-IO(high)

*[-ATR] /a, ε, ɔ/ do not undergo harmony*

(26) Intervening /a/ blocks harmony:

“LOCALITY” (e.g. \*SKIP(σ)) dominates LICENSE([+high])

(27) Local assimilation with non-adjacent target scope

Input	Output	IDENT(ATR)	LOCALITY	LICENSE([+hi])	IDENT(hi)
i. /orden-i/	a. <i>úrđini</i>				**
	b. <i>órđeni</i>			*!	
	c. <i>úrđeni</i>		*!		*
ii. /persegi/	a. <i>pérsegi</i>			*	
	b. <i>pírsigi</i>	*!			**
	c. <i>pérsigi</i>			*	*!

(28) Blocking by /a/

/lavor-a-v-i/	IDENT(ATR)	LOCALITY	LICENSE([+high])	IDENT(high)
a. <i>lavóravi</i>			*	
b. <i>lavúriví</i>	*!			**
c. <i>lavúravi</i>		*!		*

(29) Ascrea ranking: Unstressed penult is skipped

LICENSE >> IDENT(F) >> LOCALITY

**(30) Consequences for adjacency contrasts examined thus far:**

- A constraint that restricts assimilation to adjacent elements could be responsible for what distinguishes Ascrea from Central Veneto.
  - The difference in adjacency for target scope, which distinguishes Ascrea and Central Veneto from Buchan Scots, must be captured by something else.
  - Although global evaluation can obtain non-adjacent target scope, it encounters difficulties with the myopic harmony pattern of Tuvan (§4).
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**3.3 Targets and the harmony imperative**

- LICENSE constraint identifies a *target* for harmony.
  - In some harmony patterns, specific target effects can be achieved by markedness constraints and/or faithfulness constraints that prevent certain vowels from undergoing harmony (e.g. Kaun 1995, Beckman 1997, Baković 2000; with a rule-based harmony imperative, see Archangeli & Pulleyblank 1994).
  - In Central Veneto, targets are particular vowels in stressed syllables. Vowels with the same qualities in unstressed syllables are not targets.
    - As the vowels have the same qualities, the difference cannot be captured by context-free markedness constraints or IDENT(F) constraints.
    - The vowels that are targeted are in a stressed syllable, so the difference is not predicted by positional faithfulness, which could be expected to protect stressed syllables rather than unstressed ones.
    - Prominence-based markedness (e.g. metrical prominence) is unlikely to
      - favor raising in a stressed syllable — reduces sonority-based prominence in a prominent syllable.
      - prevent raising in an unstressed syllable — misses an opportunity to reduce sonority-based prominence in a non-prominent syllable.
  - Points to a conclusion that targetless harmony constraints like AGREE(F) (Baković 2000), SHARE(F) (McCarthy 2009), SPREAD(F) (Padgett 1995a) in combination with constraints like those described above are not appropriate to characterize certain harmony systems with specific targets.
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**(31) Summary**

- Adjacency effects for target scope are independent of locality of assimilation.
- Harmony systems that target a stressed vowel but not an intervening unstressed one do not seem to be driven by a targetless harmony imperative.
  - Something is needed to require that assimilation reach the stressed syllable, e.g. LICENSE(F/σ).
  - LICENSE(F/σ) obviates a separate harmony imperative for the system.

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#### 4. Myopia in harmony

(32) Myopic harmony:

In a sequence [V1•V2•V3 ...] whether harmony proceeds from V1 to V2 does not depend on whether it continues to V3 or onward (or mirror image for leftward harmony) (Wilson 2003, 2006).

- Leftward harmony in Central Veneto is not myopic. In  $\sigma_1\sigma_2\sigma_3$ , whether harmony proceeds from  $\sigma_3$  to  $\sigma_2$  depends on whether it continues to  $\sigma_1$  (*úrdini vs pérsegi*).
  - But many harmony systems are myopic. Case in point: Tuvan round harmony.
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##### 4.1 Myopic harmony: Tuvan (Turkic) (Harrison 2000)

(33) Tuvan vowel qualities:

i	y	ɯ	u
e	ø	a	o

(34) Tuvan round harmony:

- A high vowel is round if it follows a round vowel.

(35) Round harmony targets only high vowels. Tuvan also presents a backness harmony seen in the data. Compare suffix alternations for rounding:

a. High suffix vowel: Accusative /-NI/ (N is realized as n/d/t, depending on context)

[y] <b>byryn-ny</b>	‘leaf’ (acc.)
<b>xøl-dy</b>	‘lake’ (acc.) <sup>4</sup>
[u] <b>nom-nu</b>	‘book’ (acc.)
<b>xoj-nu</b>	‘sheep’ (acc.)
[i] adik-ti	‘boot’ (acc.)
inek-ti	‘cow’ (acc.)
[ɯ]xadu-nu	‘pine’ (acc.)
day-nu	‘mountain’ (acc.)

b. Non-high suffix vowel: Ablative /-DAn/ (D is realized as d/t)

[e] <b>byry-den</b>	‘leaf’ (abl.)
<b>xøl-den</b>	‘lake’ (abl.)
idik-ten	‘boot’ (abl.)
tʃem-den	‘food’ (abl.)
[a] <b>uzurun-dan</b>	‘reason’ (abl.)
<b>nom-dan</b>	‘book’ (abl.)
xadu-dan	‘pine’ (abl.)
xoraj-dan	‘town’ (abl.)

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<sup>4</sup> Harrison (2000:21) transcribes the accusative and ablative forms for ‘lake’ with the root vowel [o]. This appears to be a typographic error, as elsewhere he transcribes the root vowel as [ø] (= IPA: [ø]) (pp. 20, 132, 144). The vowel has accordingly been changed to [ø] here.

(36) Round harmony can affect multiple suffix vowels (a), but a non-high unround vowel blocks harmony (b):

- |    |                       |                        |              |                          |
|----|-----------------------|------------------------|--------------|--------------------------|
| a. | nom- <u>uŋ</u> -nu    | ‘your book’ (acc.)     | cf. xar-uŋ   | ‘your snow’              |
| b. | <b>nom-uŋar-nu</b>    | ‘your book’ (pl. acc.) | cf. xar-uŋar | ‘your snow’ (pl.)        |
|    | *nom-uŋar-nu          |                        |              |                          |
|    | *nom- <u>uŋar</u> -nu |                        |              | <b>Harmony is myopic</b> |

(37) Summary: Tuvan

- Tuvan round harmony targets high vowels.
- Target must be in an adjacent syllable.
- Tuvan harmony is myopic.

#### 4.2 Myopic unbounded harmony in classic OT

- Unbounded harmony:  
Where viable targets occur, the extent of harmony is not limited. In principle, it could affect syllables up to the end of the word.
- A myopic system like in Tuvan is compatible with well-formedness assessed in a series of windows where the **adjacent** syllable is visible but not beyond. Its target scope could thus be considered adjacent (recall Buchan Scots in (10)).

(38) /nom-IŋAr-NI/      book-3.poss.pl.-acc.

- a. Round harmony from  $\sigma_1$  to  $\sigma_2$   
nom-uŋAR-NI
- b. No round harmony from  $\sigma_2$  to  $\sigma_3$   
 nom-uŋar-NI
- c. No round harmony from  $\sigma_3$  to  $\sigma_4$   
 nom-uŋar-nu

(39) Because the operation of harmony is assessed in adjacent syllable windows, round harmony from  $\sigma_1$  to  $\sigma_2$  is not influenced by the failure of harmony to  $\sigma_3$  or  $\sigma_4$ .

(40) Rule based approaches

Unbounded myopic harmony can be handled with iterative application of a local spreading rule (see Wilson 2003 for an overview).

(41) Classic OT (Prince & Smolensky 2004)

- Myopic assimilations are problematic (Wilson 2003, 2006; also McCarthy 2004, 2009).
- The harmony-driving constraint AGREE(F) is possibly the constraint whose conception is closest to iterative local spreading. But it predicts that if assimilation in a given form is not enforced for all vowels, it will affect none.

- (42) AGREE(F) (Baković 2000)  
Adjacent elements have the same value of the feature [F].

- (43) Myopic harmony is problematic in classic OT: (Syllables with round Vs are underlined)

	/nom-IŋAr-NI/	*[+round, -high]	AGREE (round)	IDENT(round)
No harmony	a. ☹ <u>nomuŋarnu</u>	*	*	
Harmony to $\sigma_2$ , <b>attested form</b>	b. <u>nomuŋarnu</u>	*	*	*!
Harmony to all syllables	c. <u>nomuŋornu</u>	**!		***
Harmony skips $\sigma_3$ .	d. <u>nomuŋarnu</u>	*	**!	**

- Although AGREE(F) incorporates adjacency in its statement, OT's global assessment of the constraint over a candidate output produces an unwanted 'sour grapes' effect (Padgett 1995b). That is, harmony is expected to show an 'all or nothing' pattern, as in (a), rather than partial harmony in (b) attested in Tuvan.
- Various solutions have been suggested to obtain unbounded myopic spreading:
  - Harmony-driving constraint that is evaluated in such a way that a violation is assigned for each vowel that does not harmonize; for example, ALIGN(F) (Kirchner 1993), EXTEND(F) (Kaun 1995), SPREAD(F) (Padgett 1995a), MATCH(F) (McCarthy 2003a). But these introduce other problematic predictions (Wilson 2003, 2006, McCarthy 2004, 2009).
  - Targeted constraints (Wilson 2003, 2006). But note debate and overall limitations (McCarthy 2003b, Kavitskaya & Staroverov 2008).
  - Harmonic serialism and SHARE(F) (McCarthy 2009). But complications are presented by the bounded harmony of Central Veneto (see below).
- Sidenote: In classic OT, AGREE(F) does not predict transparent segments, as in (43d) (Baković & Wilson 2000). Whereas this is a positive result for patterns like Tuvan round harmony, it is too restrictive to obtain the Ascrea pattern.

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### 4.3 Derivations in Harmonic Serialism

- (44) Harmonic Serialism (HS) (Prince & Smolensky 2004):

- A version of OT where GEN makes only a single change at a time in compliance with a requirement of *gradualness*. (Explored in work by McCarthy 2006, 2007, 2008a,b, 2009, Kimper 2008, Pruitt 2008, Wolf 2008.)
- Each stage of a derivation must progress towards improved harmony with respect to the grammar (EVAL).

(45) Some assumptions about a derivational step in HS:

- The changes GEN makes incur no more than “a single violation of a basic faithfulness constraint in a specific location in a form” (McCarthy 2007:61).
- Basic faithfulness constraints include MAX(*x*), DEP(*x*), and IDENT(*f*).

(46) **Iterativity issue**

- Gradualness in HS can produce the effect of *iterative* spreading and prevent *fell-swoop* harmony, where all segments that undergo harmony are affected at once.
- Achieves positive results for myopic unbounded harmony like that in Tuvan.
- Problematic for Central Veneto harmony.

(47) Hypothesized derivation 1: Antepenult raising precedes penult raising  
 órdeni

úrdeni                      Stressed syllable raising (driven by LICENSE)

úrdini                      Unstressed penult raising (driven by LOCALITY)

- For this derivation to succeed, LOCALITY, which drives the eventual assimilation in the penult, must be ranked between LICENSE and IDENT(high).

(48) Antepenult raising precedes penult raising

/orden-i/	IDENT(ATR)	LICENSE([+high])	LOCALITY	IDENT(high)
a. órdeni		*		
b. úrdeni			*	*
c. úrdini				**

- Under the ranking in (48), the series of candidates in the hypothesized derivation is harmonically improving: (c) > (b) > (a).
- In order for (b) to be a successor to (a) in a derivation, LICENSE([+high]) must dominate LOCALITY.

(49) Erroneous prediction that /a/ will be transparent

/lavor-a-v-i/	IDENT(ATR)	LICENSE([+high])	LOCALITY	IDENT(high)
a. lavóravi		*		
b. ⊕ lavúravi			*	*
c. lavúriví	*			**

- Candidate (b), with transparent /a/, is harmonically improving over (a), with blocking /a/. Makes wrong prediction that /a/ will be transparent.

(50) Hypothesized derivation 2: The unstressed penult raises first

órdeni

órdini    \*\*    **Not harmonically improving** (does not satisfy LICENSE)

úrdini

(51) Hypothesized derivation 3: The penult and antepenult raise simultaneously  
 órdeni  
 úrdini \*\* **Does not obey gradualness**

(52) Possible solution?: Simultaneous approach (McCarthy 2008a)

- Permit GEN to simultaneously add multiple violations of a single basic faithfulness constraint.
- But loses welcome results of the prior formulation of gradualness:
  - needed to rule out unwanted predictions of the harmony imperative SHARE(F) for myopic systems in HS (McCarthy 2009:14-15).<sup>5</sup>
  - rules out apparently unattested patterns of truncation and metathesis (McCarthy 2006, 2007).
  - it has been argued that stress assignment must iterate in HS (McCarthy 2008a, Pruitt 2008).

**5. Summing up: Theoretical implications**

(53) **Locality:** Distinguished here in relation to two phenomena

Locality Dimension	Adjacent	Non-adjacent
<b>Target scope</b>	<ul style="list-style-type: none"> <li>• Buchan Scots height harmony</li> </ul>	<ul style="list-style-type: none"> <li>• Ascrea height harmony</li> <li>• C. Veneto height harmony</li> </ul>
<b>Locality of assimilation</b>	<ul style="list-style-type: none"> <li>• C. Veneto height harmony</li> </ul>	<ul style="list-style-type: none"> <li>• Ascrea height harmony</li> </ul>

- Central Veneto can sight a target in a non-adjacent syllable but its harmony must proceed through adjacent syllables.
- A constraint that enforces locality of assimilation (e.g. \*SKIP(σ)) cannot be responsible for target scope restricted to adjacent syllables.
- Whereas global assessment of well-formedness in a form, as implemented in classic OT, can generate patterns with non-adjacent target scope, it has difficulties contending with myopic unbounded harmony.

<sup>5</sup> The analysis of harmony in HS by McCarthy (2009) assumes that GEN’s set of operations for autosegmental representations are restricted to insertion/deletion of a single association line linking two elements of pre-existing structure or insertion/deletion of a feature and a single association line linking it to some pre-existing structure (p. 14). The latter is needed to prevent the unwanted spontaneous harmony prediction that McCarthy discusses. Perhaps if faithfulness violations could be segregated along these lines and GEN were permitted to insert multiple association lines for a given pre-existing autosegment in a single pass, the problem could be resolved. This warrants further investigation. Nevertheless, it is not clear that a meaningful concept of gradualness could equally admit any extent of feature spreading while distinguishing, for example, insertion or deletion of different lengths of segment strings.

**(54) The harmony imperative**

- In classic OT, AGREE(F) has problems obtaining
  - myopic harmony with local assimilation (Tuvan)
  - harmony with transparent segments (Ascrea)
  - harmony with non-adjacent target scope (C. Veneto and Ascrea)
- A proposed alternative: In HS, SHARE(F), which requires adjacent segments to be linked to the same autosegment [F], is suggested to be the harmony imperative for unbounded myopic harmony (McCarthy 2009). SHARE(F) is rather like AGREE(F), but differs in that it is violated even when neither segment is associated to [F].
- Bounded harmony patterns with particular targets (e.g. Ascrea, C. Veneto) can be obtained with a harmony imperative that references a target. A blind harmony imperative alone is insufficient for these patterns, and a LICENSE constraint obviates it.<sup>6</sup>

**(55) Derivations**

- Harmony in Central Veneto is not iterative. The derivation does not pass through an intermediate representation where an unstressed penult vowel has undergone harmony and the stressed vowel has not. (Likewise there are problems with a sequence where stressed syllable raising precedes raising in an unstressed penult.)
- Myopic harmony as in Tuvan could be iterative (McCarthy 2009). More generally, the HS approach to myopic harmony as formulated with SHARE(F) relies on the equivalent of iterative violations of IDENT(F).

**(56) Work that lies ahead: Reconciling different harmony systems**

- Results point to
  - differences in scope of assessment (e.g. global vs. adjacent only).
  - differences in locality of assimilation (adjacent vs. non-adjacent).
  - more than one harmony imperative (e.g. with targets and without).
  - differences in derivational types (e.g. fell-swoop vs. gradual).
- Neither classic OT nor HS currently fare well in capturing the full range of systems.
- Efforts to solve theoretical shortfalls for properties of particular patterns must take into consideration the other patterns that are attested.
- Grappling with these issues could lead to advances in conceptualization of the theoretical architecture.

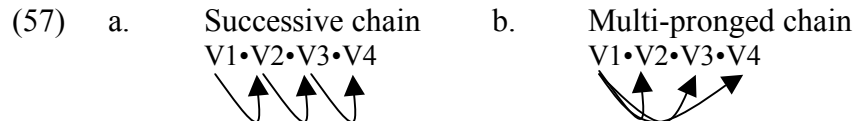
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<sup>6</sup> A separate observation made in connection with these harmony systems is that the distribution of the features that show harmony does not seem to ever alter stress assignment in any language. See Walker (2005) and Blumenfeld (2006) for discussion.

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**Further research: locality in trigger-target chains**

- Another type of (non-)adjacency effect can arise in assimilations that effect multiple segments.
- Assimilations can be successively chained with each target forming the trigger for the next target, as schematized in (57a), or they can operate in a multi-pronged fashion with a single trigger simultaneously targeting multiple segments, both adjacent and non-adjacent (57b).



(58) Successive chain harmony: Yakut (Kaun 1995)

- Round harmony in Yakut occurs except when the trigger is high and the target non-high. Compare (a) versus (b).
- Although /o/ triggers round harmony in a non-high vowel (a), it fails to trigger harmony in a non-adjacent vowel (c), suggesting a successive chain relation.

- a. ohoχ-tor      ‘stove’ (pl.)  
 b. tynnyk-ter      ‘window’ (pl.)  
 c. tobuk-ka      ‘knee’ (dat.)

(59) Multi-pronged chain harmony: Jingulu (Pensalfini 2002, Nevins to appear)

- Jingulu vowels: /i, a, u/
- /a/ undergoes height harmony with high vowels in certain suffixes (a).
- High root vowels do not trigger harmony and they block it (b), suggesting a multi-pronged chain relation for harmony.

- a. bardarba                  b̄ird̄irb̄i-rni                  ‘younger brother / younger sister’  
 ngarrabaja                nḡirrib̄ij̄i-wurru-nu      ‘dog / dog (f)’
- b. mamambiyaka          mamambiȳik̄i-mi          ‘soft / soft.veg.’  
 ngamurla                  ngamurl̄i-rni              ‘big / big (f)’

*A theory of locality in phonology must also have the capacity to discriminate between these patterns.*

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