Consonant harmony and vowel harmony: Comparisons in typology and sources for nonlocality

Rachel Walker
University of Southern California
rwalker@usc.edu

1. Introduction

Action-at-a-distance
- A notable feature of many harmony systems is their capacity for action-at-a-distance.
- Long-standing questions surround what gives rise to nonlocal segmental interactions and the mechanisms that make them possible.

Consonant harmony versus vowel harmony
- It would be appealing to unify the analysis of vowel harmony (VH) and consonant harmony (CH) systems.
- Nevertheless, VH and CH show typological differences in some areas pertaining to:
  o Interacting segments
  o Transparent segments
  o Blocking effects
- The first two areas of difference are of particular interest because they relate to harmony systems’ potential for long-distance interactions.

(1) Two-fold aims for this talk
i. Probe the relational dimensions and structures that enable interactions among nonadjacent segments.
ii. Examine areas of typological difference between VH and CH.

Local interactions
- In the temporal dimension, locality serves as a basis for relating segments, such that adjacent segments are more prone to mutual restrictions.
- Vowels in adjacent syllables can be considered articulatorily adjacent (Gafos 1996, Ni Chiosáin & Padgett 2001).
  (Proximity has also been treated in a scalar fashion, with more stringent restrictions levied over more proximate segments. See, e.g., Suzuki 1998, Walker 2000c, Hansson 2001, 2010, Pulleyblank 2002.)

(2) Concentrate here on sources for nonlocal interactions among segments
i. Similarity – spatial symmetry
ii. Prominence differences – prosodic/positional antisymmetry
  • Prominence-based Licensing approach (Walker 2011).
  • Additional topics that will be touched upon as sources of nonlocality:
    o Inventory structure and contrast.
    o Triggers that are weak in quality.

(3) Preview
- Consonant harmony
  o Similarity serves as a basis for segmental interactions that can be nonlocal.
  o Captured in similarity-driven ABC approach.
- Vowel harmony
  o Proposals have been made to analyze VH in the ABC approach.
Three areas where ABC is problematic for VH patterns are discussed.

i. Inventory-sensitive sources for potentially nonlocal interactions. Points to need for forms of sensitivity to contrast.

ii. Prominence differences as a basis for potentially nonlocal interactions.

iii. Biases for triggers with perceptually weak qualities.

2. Consonant harmony

(4) CH typology

- CH refers to patterns in which consonants are required to agree in some property, where the consonants can be separated by at least one segment.

- A core insight emerging from typological studies of consonant harmony is that similar consonants are more prone to interact (Hansson 2001, 2010, Rose & Walker 2004).

Example: Kikongo (Bantu)


- Kikongo shows nasal CH between nasals and following voiced oral stops and /l/.

- The perfective active suffix, with oral variants [–idi] and [–ele], shows variants with a nasal consonant when preceded by a nasal in the stem (5).

- Nasal harmony operates across intervening vowels and voiceless consonants, which remain oral.

- In addition to engendering alternations in suffixes, the generalization holds that nasals are not followed by {b, d, g, l} in stems.

(5) Nasal suffix variants

- nik-ini ‘grind’
- nat-ini ‘carry’
- leem-ene ‘shine’
- futumuk-ini ‘revive, rise’

Oral suffix variants

- suk-idi ‘wash’
- bak-idi ‘catch’
- sos-ele ‘search for’

- The consonants that interact with nasals in Kikongo nasal CH are those that are most similar to nasals.

- This criterion for the interacting segments differs from nasal V-C harmony, where the segments that are most prone to interact with nasals are vowels, and voiced stops interact with nasals only when all sonorant segments do also (Walker 1998).

(6) Similarity as a source of nonlocality

- Similarity serves as a type of spatial symmetry between segments in the sense that spatial properties of the segments’ representations are structurally similar (e.g. location of constriction, degree of stricture, etc.).

- A large body of work has suggested that similarity promotes interactions among segments.

- More specifically, it has been proposed that similarity can give rise to the formation of relations between segments that can transcend adjacency.

Agreement by Correspondence approach

- Correspondence is established between similar segments in an output.
- Feature identity requirement in corresponding segments brings about agreement.

(Details of analysis here follow Rose & Walker 2004.)

\[ \text{(7) Agreement by Correspondence} \]

\[ \begin{array}{c|c|c}
| \text{[F]} \text{ identity} & \ast & \checkmark \\
| \text{[+nas]} & \text{[–nas]} & \text{[+nas]} \text{ [+nas]} \\
\end{array} \]

(8) CORR-XX constraints

- Assign a penalty to any pair of Xs that are not in correspondence in the output.
- Correspondence is similarity driven. Xs can be restricted so that they share certain features. CORR-XX(\( \alpha F \)), enforces correspondence between X’s that are specified \([\alpha F]\).

(See McCarthy 2010 for a different proposal.)

- Implicational relationship: If two segments sharing certain features are required to correspond, then segments that are more similar in the same dimension are also required to correspond. Captured by fixed rankings or stringent constraints.

(9) IDENT-XX(F) constraints

- Assign a penalty to any pair of corresponding Xs in the output that do not match in specification for [F].

- Evaluated locally over chain-adjacent pairs (Hansson 2007). In other words, in a corresponding sequence \([…S_1…S_2…S_3…]\), IDENT-XX(F) enforces identity for [F] between \(S_1\) and \(S_2\) and between \(S_2\) and \(S_3\).

(10) Ranking structure for harmony driven by ABC

\[ \text{CORR-XX} \quad \text{IDENT-XX(F)} \]

\[ \text{IDENT-IO(F)} \]

(11) Illustration:

\[ \text{CORR-XX(+cons, –cont, +voi), IDENT-XX(nas) >> IDENT-IO(nas)} \]

\[ \begin{array}{cccc}
\text{/-nat-idi/} & \text{CORR-XX} & \text{IDENT-XX} & \text{IDENT-IO} \\
& (+cons, –cont, +voi) & (nas) & (nas) \\
\hline
\text{a. } n̄ \text{atin}i & \text{–} & \ast & \text{–} \\
\text{b. } n̄ \text{atid}i & \text{–} & *! & \text{–} \\
\text{c. } n̄ \text{atid}j & *! & \text{–} & \text{–} \\
\end{array} \]

(12) Voiceless stops do not participate

- IDENT-IO(F) dominates the constraint that enforces correspondence between nasals and all oral stops:

\[ \text{[a]} \text{[a]} \text{[a]} \text{i} \text{i} [i] \text{[i]} > \text{[a]} \text{[a]} \text{[a]} \text{i} \text{[i]} \text{[i]} \]

via IDENT-IO(nas) >> CORR-XX(+cons, –cont)

(13) Transparency versus blocking

• ABC has the capacity to capture blocking behavior in harmony in specific circumstances. The highly specific nature of the ranking configuration is suggested by Hansson (2010) to minimize the attestation of blocking in CH.

• The blocking segment stands in correspondence with a potential trigger or a potential target, but it interferes with a correspondence chain linking segments that are expected to harmonize (Hansson 2007, 2010, Walker 2009, Rhodes 2010a).

(14) Summary: Agreement by Correspondence
• Makes three basic predictions about harmony:
  i. Harmony is favored among segments that are similar (Agreement By Correspondence; ABC).
  ii. Segments that are transparent are dissimilar from triggers for harmony (Transparency by Lack of Correspondence; TLC).
  iii. Segments that block harmony show some similarity with triggers or targets (Blocking By Correspondence; BBC)

3. Vowel harmony

(15) VH and ABC
• Studies have shown that it is possible to analyze some VH systems using ABC (Hansson 2006, Sasa 2009, Walker 2009, Rhodes 2010a).

• This work has shown that the ABC approach has the capacity to capture triggering, blocking, and transparency effects, even when they all occur in the same system.

• Despite these capabilities, there are questionable aspects of the predicted typology when it comes to VH.

3.1 Transparency in VH that appears to be inventory-sensitive

Example: Lokaa (Niger-Congo) (Akinlabi 2009)

(16) Vowel inventory

\[
\begin{array}{ll}
{+ATR} & {-ATR} \\
\hline
i & u \\
\varepsilon & \varepsilon & o & a
\end{array}
\]

Lokaa ATR harmony
• Lokaa exhibits regressive ATR harmony in the PrWd among paired mid vowels.\(^1\)

(17) \([+ATR] \quad [-ATR] \)

lè-kòl ‘war’  lè-dè ‘greeting’
ò-bèlè ‘water pot’  lò-tè ‘giant ant’
è-tòm ‘life’  è-kà ‘cloth’

• [a] and [əә] trigger ATR harmony in preceding mid vowels (18a-b).

• [a] blocks [+ATR] harmony from following vowels (18c).

• The status of [əә] is “indeterminate” with respect to whether it is transparent or blocks harmony (Akinlabi 2009:197).

(18) a. \([a] \text{ triggers harmony for } [+ATR] \)

è-dâl ‘louse’
ò-dâm ‘man, male’

b. \([a] \text{ triggers harmony for } [-ATR] \)
è-tál ‘kite’
ò-kà ‘needle’

\(^1\) This description characterizes the basic system of Lokaa’s ATR harmony. For more details, see Akinlabi (2009).
c. \([a]\) blocks \([+ATR]\) harmony

<table>
<thead>
<tr>
<th>(+ATR)</th>
<th>([-ATR])</th>
</tr>
</thead>
<tbody>
<tr>
<td>è-sísọ́ ‘smoke’</td>
<td>è-sísọ́ ‘housefly’</td>
</tr>
<tr>
<td>óyíná ‘story’</td>
<td>lọtítàj ‘rib’</td>
</tr>
<tr>
<td>kè-túkó ‘running’</td>
<td>b-túmá ‘need’</td>
</tr>
<tr>
<td>kó-fúkó ‘counting’</td>
<td>kè-fúkà ‘gathering (things)’</td>
</tr>
</tbody>
</table>

**Why could we expect high vowels in Lokaa to be transparent?**

- High vowels lack \([-ATR]\) counterparts, i.e. there is no \([ATR]\) contrast among the high vowels.

The history of Lokaa’s vowels

- Lokaa’s high vowels are believed to have historically presented a \([±ATR]\) contrast (Akinlabi 2009), which was found in Benue-Congo high vowels (Stewart 1971, Williamson 1973).
- The historical contrast is evidenced in some high vowel stems of Lokaa which select \([-ATR]\) prefixes (20b), analyzed by Akinlabi with a floating \([-ATR]\) feature.

(20) a. è-kpí ‘rat’  
    b. ó-kpí ‘viper’  
    lè-du ‘trash’  
    kè-yú ‘riches’

Transparency in Lokaa and ABC

- Could be captured by enforcing correspondence among nonhigh vowels only, using CORR-XX\((-\text{high})\), and ranking the constraint that drives correspondence among all vowels (CORR-XX\((+\text{vocalic})\)) below the relevant faithfulness constraint.

(On the feature \([\text{vocalic}]\), see Nevins & Chitoran 2008 and Padgett 2008)

(21) For an input \(/e-CiC\öC/\)

i. Winner vs. candidate where nonhigh vowels do not correspond

\[
\text{è} - C\ i\ C\ \ö\ C > \text{è} - C\ i\ C\ \ö\ C
\]

via CORR-XX\((-\text{high})\) >> IDENT-IO\((\text{ATR})\)

ii. Winner vs. candidate where nonhigh vowels correspond but do not agree

\[
\text{è} - C\ i\ C\ \ö\ C > \text{è} - C\ i\ C\ \ö\ C
\]

via IDENT-XX\((\text{ATR})\) >> IDENT-IO\((\text{ATR})\)

iii. Winner vs. candidate where high and nonhigh vowels correspond and agree

\[
\text{è} - C\ i\ C\ \ö\ C > \text{è} - C\ i\ C\ \ö\ C
\]

via IDENT-IO\((\text{ATR})\) >> CORR-XX\((+\text{vocalic})\)

(22) Recapitulation of comparisons in (21)

<table>
<thead>
<tr>
<th>/e-CiC\öC/</th>
<th>CORR-XX((-\text{high}))</th>
<th>IDENT-XX((\text{ATR}))</th>
<th>IDENT-IO((\text{ATR}))</th>
<th>CORR-XX((+\text{vocalic}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (\text{è} - C\ i\ C\ \ö\ C)</td>
<td></td>
<td></td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>b. (\text{è} - C\ i\ C\ \ö\ C)</td>
<td></td>
<td></td>
<td>*!</td>
<td>***</td>
</tr>
<tr>
<td>c. (\text{è} - C\ i\ C\ \ö\ C)</td>
<td></td>
<td></td>
<td>*!</td>
<td>**</td>
</tr>
<tr>
<td>d. (\text{è} - C\ i\ C\ \ö\ C)</td>
<td></td>
<td></td>
<td></td>
<td>**!</td>
</tr>
</tbody>
</table>

- According to the intuition behind the ABC approach, high vowels do not interact in ATR harmony with mid vowels, *because they are not sufficiently similar to them*.
- Yet this strategy does not make a connection to the lack of ATR contrast in Lokaa’s high vowels.
(23) Integrating a role for contrast?

- Rhodes (2010a) has a proposal in development where CORR-XX constraints can reference the feature strength in a segment, which can depend on its contrastive status.

- The question of whether transparent segments are always non-contrastive for the harmonizing feature has a long history. (Work in the last decade alone includes the following, Krämer 2003, Calabrese 2005, Dresher 2009, MacKenzie 2009, 2011, Nevins 2010, and Rhodes 2010b, a.o.)

- The issue depends in part on how contrastivity is calculated, which is debated in some of these works.

- Even if CORR-XX constraints were sensitive to the contrastive status of a feature, this leaves unclear whether the similarity-driven basis for correspondence and action-at-a-distance would remain intact.

(24) A further issue

- The ABC approach predicts a harmony system where high vowels that contrast for ATR are transparent to harmony among mid vowels. At a minimum, this is typologically rare.

- If a language had an inventory like Loka’a’s but additionally retained the ATR contrast among high vowels, high vowels could be rendered transparent to ATR harmony among mid vowels in the same way as in (21–22) above.

- In fact, it is possible to generate a height-stratified ATR harmony and transparency system, where high vowels harmonize but mid-vowels are transparent, and mid vowels harmonize but high vowels are transparent (see (25–26)).

(25) For an input: /e-CiɔCuC/

The output could be: e₁ - C i₁ C ɔ u₁ C Arrows highlight harmonizing Vs

(26) CORR-XX(–high) CORR-XX(+high) IDENT-XX(ATR)

IDENT-IO(ATR)

CORR-XX(+voc)

(27) Illustration of constraint hierarchy in (26)

<table>
<thead>
<tr>
<th>/e-CiɔCuC/</th>
<th>CORR-XX (–high)</th>
<th>CORR-XX (+high)</th>
<th>IDENT-XX (ATR)</th>
<th>IDENT-IO (ATR)</th>
<th>CORR-XX (+voc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>e₁-CiɔCuC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>e₁-CiɔCuC</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>e₁-CiɔCuC</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>e₁-CiɔCuC</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(28) No cross-height harmony: IDENT-XX(high), IDENT-IO(high) >> CORR-XX(+voc):

<table>
<thead>
<tr>
<th>/e-CiɔCuC/</th>
<th>CORR-XX (–high)</th>
<th>IDENT-IO (ATR)</th>
<th>IDENT-XX (high)</th>
<th>IDENT-IO (high)</th>
<th>CORR-XX (+voc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>e₁-CiɔCuC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>e₁-CiɔCoCuC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>i₁-CiɔCuCuC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary: Inventory sensitivity

- Transparent vowels in unbounded VH tend to be those that lack a contrast for the harmonizing feature.
- The mechanics of similarity-driven ABC do not line up well with this typological characteristic of VH, although there may be ways to elaborate the approach to make it a better fit.
- The capacity of the ABC apparatus for conditional transparency, where a vowel may be transparent to harmony from one kind of trigger but not another, appears problematic.

Note: Whether this prediction is problematic for CH also needs attention, but it seems to me to be more likely to be attested in CH patterns.

3.2 Nonlocal interactions in VH sensitive to prominence asymmetries

Interactions among vowels that show prominence asymmetries

- Vowels in contexts that are asymmetrically weak in prominence can harmonize with vowels in strong positions (e.g. initial, stressed, root).
- Some patterns show action-at-a-distance (Walker 2011).

Example: Eastern Meadow dialect of Mari (Uralic) (Vaysman 2009)

Vowel inventory

- Vowels in the final syllable assimilate in backness to the vowel in the initial syllable (32).

Boxed forms in (32), with disharmonic stems, show that backness harmony can operate across full vowels with opposite specifications for back.

Why a similarity-driven ABC approach does not seem promising

- The harmonizing vowels reside in positions of asymmetric prominence rather than in symmetric positions.
  - Final syllables show mixed effects, and are often associated with weakness (Barnes 2006, Walker 2011).
  - Further, a separate pattern of round harmony in Eastern Meadow Mari (not shown here) operates between stressed vowels and final syllables, displaying a prosodic asymmetry.
- Similarity in vowel quality does not provide a basis for identifying the trigger and target for back harmony. The transparent vowel can be of the same quality as a target, e.g. /merän-län/ \(\rightarrow\) [merän-län] ‘hare.’

\[\text{Nom. sg. 2 pl. poss. suffix}\]

<table>
<thead>
<tr>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>ém-dæ ‘medicine’</td>
<td>hùér-ta ‘news’</td>
</tr>
<tr>
<td>tʃodrá-tæ ‘forest’</td>
<td>kutkó-ta ‘ant’</td>
</tr>
<tr>
<td>tʃijjé-tæ ‘paint’</td>
<td>olk-tá ‘meadow’</td>
</tr>
<tr>
<td>tya-tá ‘edge’</td>
<td>tɔwɔs-tá ‘fox’</td>
</tr>
</tbody>
</table>

\[\text{Dative suffix}\]

<table>
<thead>
<tr>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>merán-län ‘hare’</td>
<td>keŋčʒ-län ‘summer’</td>
</tr>
<tr>
<td>inŋa-län ‘horse’</td>
<td>olma-lan ‘apple’</td>
</tr>
<tr>
<td>kyzɔ-tän ‘knife’</td>
<td>munɔ-län ‘egg’</td>
</tr>
</tbody>
</table>

\[\text{Example: Eastern Meadow dialect of Mari (Uralic) (Vaysman 2009)}\]

- Intervening vowels can be transparent.

\[\text{Intervening vowels can be transparent.}\]

2 See Majors 1998 on stress-controlled VH patterns suggested to originate in coarticulation, which are not expected to show action-at-a-distance.

3 [æ] occurs only in non-initial syllables and is possibly non-phonemic.
Other VH patterns with prominence asymmetries

• Other systems show VH between positions of asymmetric strength where harmony is controlled by the vowel in weak position.

• Examples that can operate among nonadjacent vowels include the dialect of Lena (Neira Martínez 1955, 1983, Hualde 1989, 1998) and the dialect of Ascrea (Fanti 1938–1940, Maiden 1991, Walker 2011), both involving stressed vowels assimilating to unstressed.

Prominence-based Licensing analysis

• It has been proposed that *prominence differences* can form the basis for segmental interactions that are potentially nonlocal.

• Such interactions have been formalized in terms of Prominence-based Licensing.

• Prominence-based Licensing constraints assign a penalty to distinctive segmental properties that are expressed only in non-prominent contexts.

• Such constraints can drive assimilation between strong and weak positions, operating from weak-to-strong or strong-to-weak.

• They also can drive neutralization, deletion, and metathesis.

Nonlocal licensing-driven interaction

• Specification for [−back] in strong (s) initial position licenses [−back] in weak (w) final position

\[ m \varepsilon_\text{r \-á n} \rightarrow \text{\[−back\]} \rightarrow \text{\[−back\]} \]

CH and Prominence-based Licensing?

• It has been claimed that prosody does not play a role in CH systems (Hansson 2001, 2010).

• Apart from stem control, positional asymmetries do not seem to be a major conditioning factor in CH.

• Since vowels are the segments that chiefly and most commonly express prosodic properties, prosodic sensitivity in harmony is expected to most often involve vowels. However, this does not rule out prosody-sensitive CH outright.

Summary: Prominence asymmetries

• VH systems exist that display interactions between vowels with systematic differences in positional prominence.

• These patterns are not in accord with the predictions of a similarity-driven ABC approach.

• Instead, proposals have been made where prominence asymmetries can serve as a source for potentially nonlocal interactions, distinct from similarity-based interactions.

3.3 Biases for VH triggers that show weakness in vowel quality

Example: Round harmony typology (Kaun 1995, 2004)

• Front vowels are more prone to trigger round harmony (also nonhigh vowels and short vowels).

• Typologically preferred triggers for unbounded round harmony are those for which rounding has comparatively weak acoustic cues.

• Nonhigh round vowels tend to be avoided, as the product of harmony and otherwise (but note Hungarian; Jurgec 2011, Törkenczy 2011).
Example: Kazakh (Turkic) (Korn 1969, Kaun 1995)

- Kazakh shows front/back harmony.
- Round harmony among front vowels is unrestricted (40a).
- Among back vowels, round harmony operates only to high targets (40b). Boxed words show where harmony does not occur.

(40) a. køl-ðy 'lake' ACC
    køl-ðø 'lake' LOC
    yj-ðy 'house' ACC
    yj-ðø 'house' LOC

b. koj-du 'sheep' ACC
    son-dan 'rubble' ABL
    *son-don
    kul-du 'servant' ACC
    *kul-dø 'servant' LOC

(41) Difficulties for an ABC approach

- A lack of correspondence between back round vowels and /a/ does not seem feasible on the basis of similarity.
  - Correspondence relations would exist for parallel front vowels in the inventory.
  - Harmony operates from [o] to high vowels, 
    necessitating correspondence between back vowels that differ in height and rounding.

- The failure of back nonhigh vowels alone to be targets does not seem to be markedness based.
  - Nonhigh round vowels are generally accepted to be more marked than high round vowels (*RoLo, Kirchner 1993, Kaun 1995), but [ø] is more marked than [ø] (*RoRo, Kaun 1995).

(42) Weak trigger analysis

- The prevailing insight about asymmetries in this pattern derives from a bias for weak triggers, i.e. front round vowels in Kazakh.
  - Front vowels trigger harmony even if they produce rounding in a following nonhigh vowel.

- Accounts sensitive to triggers that are weak in quality have been pursued in various treatments of VH.

- These include claims that the perceptual advantage achieved by extending or repeating cues for a segment whose quality is perceptually weak can provide a basis for nonlocal interactions.

- Various constraints have been proposed that promote harmony between a trigger that is weak in quality and potentially nonlocal targets.


(43) Nonlocal interaction triggered by a weak vowel quality

- Schematic illustration: [+round] in a short vowel is related to adjacent and nonadjacent vowels (Baiyina Oroqen; Walker to appear).

(44) Weak triggers in harmony involving consonants

- Weak trigger effects have been suggested for nasal V-C harmony (Cole & Kisseberth 1995b, Walker to appear).

- Long-distance laryngeal restrictions in consonants have been suggested to have a basis in strengthening cues for contrasts
(Gallagher 2010), pointing to possible weak trigger effects in some CH phenomena.

45 Summary: Triggers that are weak in quality
• The typology of VH for rounding shows biases for weak triggers.
• Round harmony in Kazakh does not show the characteristics of a pattern based on similarity.
• Enlarging the opportunities for perception of a weak segmental quality (even apart from non-prominent positions) has been suggested as another source for potentially nonlocal interactions.

4. Discussion and closing

46 The ABC approach to harmony
• Originally developed for CH, but has been suggested as a basis for at least some patterns of VH.
• Predicts harmony will preferentially operate among similar segments, even if they occur at a distance.
• Predicts transparent segments will be comparatively dissimilar from triggers.

47 ABC and VH
• The typology of VH departs from what is predicted about which segments harmonize and which can be transparent if it were consistently attributed to ABC.

i. Inventory sensitivity
• In unbounded VH, vowels that are prone to be transparent are those that lack a contrast for the harmonizing feature (e.g. Lokaa).

• Whether this long-standing insight can be effectively integrated in a similarity-driven ABC approach remains an open question.

ii. Positional prominence differences
• Patterns of bounded VH show interactions between vowels in positions of asymmetric prominence (e.g. Eastern Meadow Mari).
• Harmony driven by prominence differences can be local, but transparency can occur for intervening elements that are not relevant to the prominence asymmetry.

iii. Weak trigger biases
• Unbounded VH shows biases for triggers in which the harmonizing feature is perceptually weaker, as in the typology of round harmony (e.g. Kazakh).
• The perceptual advantage earned by expressing the harmonizing feature in contexts beyond the trigger can promote harmony in adjacent and nonadjacent elements.

48 Two general results
a. Differences exist between CH and VH
Typological differences between CH and VH of the kind highlighted here are suggestive that CH and VH are not easily unified in full under a single mechanism, such as ABC.

b. There are distinct sources of nonlocality
Factors that play into nonlocal interactions include similarity, positional prominence asymmetries, improving perceptibility, and contrast.
(49) **Locality asymmetries in CH and VH**

- VH is more common in the languages of the world than CH.
- This could have a basis, at least in part, from intrinsic locality differences in vowels versus consonants.
- Vowels in VCV sequences are usually articulatorily adjacent, despite the overlaid consonantal articulation (unless the C involves an interfering articulation) (Gafos 1996, Ni Chiosáin & Padgett 2001, Mahanta & Grijzenhout 2004).

However, consonants in CVC sequences are not articulatorily adjacent. This difference, plus the cross-linguistic markedness of clusters of three or more consonants, severely diminishes the opportunities for local CH in contrast to local VH.⁴

(50) **Outlook**

- In future research it would be valuable to probe further into how typological properties of CH and VH are connected to intrinsic differences with respect to consonants and vowels
  i) in their adjacency
  ii) in their relevance to different sources of nonlocality.

---

**References**


⁴ Note that vowel-consonant harmony could operate among temporally adjacent segments, as in V-C nasal harmony or emphasis harmony, and plausibly also coronal harmony (for an articulatory study, see Walker et al. 2008).


McCarthy, J. J. 2010. Agreement by Correspondence without CORR Constraints. Ms., University of Massachusetts, Amherst. (Available as ROA-1089.)


Rhodes, R. 2010a. Vowel harmony as Agreement by Correspondence. Ms., University of California, Berkeley.


Rose, S. & R. Walker. 2004. A typology of consonant agreement as...
correspondence. *Lg* 80, 475–531.