Consonant harmony as feature spreading

Peter Jurgec

University of Toronto

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In this talk, I argue for a spreading-based account of consonant harmony.

1. The conventional arguments against spreading are not very compelling.

2. Spreading (in consonant and vowel harmony) is possible under relativized locality.

3. I provide two arguments against Agreement by Correspondence (ABC).
Preview: Arguments against spreading

- Feature spreading is a standard account for most kinds of assimilation.
- Two main arguments against spreading (Hansson 2001; Rose & Walker 2004):
Preview: Arguments against spreading

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- Two main arguments against spreading (Hansson 2001; Rose & Walker 2004):
  1. Mysterious harmony
     Consonant harmony seemingly applies across segments that have the feature that spreads. Other kinds of assimilation do not seem to work that way.
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  2. Similarity
     Consonant harmony affects a (small) subset of consonants, whereas other kinds of assimilation typically affect all segments, all obstruents, or all vowels.
Roadmap

1. Introduction
2. Mysterious harmony
3. Relativized locality
4. Similarity
5. Similarity+
6. Challenges for ABC
7. Conclusions
Introduction

Arguments against spreading

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- Example: Yaka nasal consonant harmony (Hyman 1995; Rose & Walker 2004)

  1. Nasal consonant harmony affects voiced consonants
     - kud-idi 'chase'
     - finuk-ini 'sulk'
     - kik-idi 'obstruct'
     - miituk-ini 'pout'
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  2. Prenasalized stops are not triggers
     - biimb-idi ‘kiss, hug’
     - taang-idi ‘read, count’
Mysterious harmony

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2. Prenasalized stops are not triggers
   - biimb-idi ‘kiss, hug’
   - taaŋg-idi ‘read, count’

3. . . . and appear to be skipped
   - nuuŋg-ini ‘win’
   - naŋg-ini ‘last’
Why spreading fails

The Yaka data suggest two things:
Why spreading fails

- The Yaka data suggest two things:
  - Nasality seemingly spreads across a nasal segment.

![Diagram showing feature spreading across nasal segments]

---

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Why spreading fails

The Yaka data suggest two things:

**Crossing**
Nasality seemingly spreads across a nasal segment.

\[
\begin{align*}
[+\text{nas}] & \rightarrow [+\text{nas}] \\
\n & \nearrow \\
\eta & g & n
\end{align*}
\]

**Skipping**
Nasality spreads across a segment that must be oral.

\[
\begin{align*}
[+\text{nas}] & \rightarrow [+\text{nas}] \\
\nearrow & \\
\n & \rightarrow [−\text{nas}] & [+\text{nas}] \\
\n & \rightarrow [−\text{nas}] & [−\text{nas}] & [+\text{nas}]
\end{align*}
\]

These patterns appear inconsistent with the standard spreading account, but are predicted by ABC.
Challenge 1: Crossing association lines

- Nasality can seemingly spread across a nasal segment.
**Challenge 1: Crossing association lines**

- Nasality can seemingly spread across a nasal segment.
- Attested in local nasal harmony: Terena (Bendor-Samuel 1960; Cole & Kisseberth 1995)
  
  \[1\text{SG.SUBJECT}\] \[3\text{SG.SUBJECT}\]
  
  \(\text{iwatako} \quad \tilde{\text{iw}}\tilde{\text{andako}}\) \quad \text{‘sat’}
  
  \(\text{otopiko} \quad \tilde{\text{o}}\tilde{\text{ndopiko}}\) \quad \text{‘chopped’}
  
  \(\text{jono} \quad \tilde{\text{j}}\tilde{\text{n}}\tilde{\text{o}}\) \quad \text{‘walked’}
  
  \(\text{arunoe} \quad \tilde{\text{a}}\tilde{\text{r}}\tilde{\text{unoe}}\) \quad \text{‘girl’}

- Nasals do not trigger nasal harmony do not interfere with nasal harmony.
Challenge 1: Crossing association lines

- Nasality can seemingly spread across a nasal segment.
- Attested in local nasal harmony: Terena (Bendor-Samuel 1960; Cole & Kisseberth 1995)

```
‘1SG.SUBJECT’ ‘3SG.SUBJECT’
iwatakō ĭwãndako ‘sat’
ōtopiko ōndopiko ‘chopped’
jono ūnō ‘walked’
arunōe ārūnōē ‘girl’
```

- Nasals do not trigger nasal harmony do not interfere with nasal harmony.

- Conventional wisdom: the Terena pattern is not an argument against spreading.
One way to analyze Terena (and Yaka) is that spreading is accompanied by fusion.

\[ [+{\text{nas}}]_1 [+{\text{nas}}]_2 \quad \rightarrow \quad [+{\text{nas}}]_{1,2} \]

Prenasalized stops cannot be triggers, which can be formalized in a variety of frameworks (Cole & Kisseberth 1995; Durvasula 2009; Jurgec 2011; Walker to appear, among many others).
Challenge 2: Skipping segments

- Nasality spreads across an oral segment.
Challenge 2: Skipping segments

- Nasality spreads across an oral segment.
- These patterns are widely attested:
  - nasal harmony in Guaraní (Gregores & Suarez 1967; Walker 1999), Barasano (Gomez-Imbert 1997), Tuyuca (Barnes 1996), and Mòbà (Ajíbóyè & Pulleyblank 2008; Jurgec 2011; Walker to appear).
  - nasal assimilation in Chiquitano (Girard, this conference)
  - more broadly, vowel harmony with transparent vowels
Challenge 2: Skipping segments

- Nasality spreads across an oral segment.
- These patterns are widely attested:
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  - nasal assimilation in Chiquitano (Girard, this conference)
  - more broadly, vowel harmony with transparent vowels
- Conventional wisdom: transparency is not an argument against spreading.
Feature geometry

- One alternative, representational way to compute locality in consonant harmony was using feature nodes (Sagey 1990).
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This approach proposes the same representations for all similar segments across languages. However, consonant harmony often skips different segments in different languages.

At least some conventional representational assumptions about feature spreading are inconsistent with consonant harmony.
The underlying issue in these discussions is locality in consonant harmony.

There are two conventional options in which locality is determined by principle:

1. Feature nodes (Odden 1991, 1994; Steriade 1987)
2. Strict locality (Ní Chiosáin & Padgett 2001; Gafos 1996)

Are these the only two options?
Other concepts of locality are not determined by a single principle:
Alternatives

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- Search and copy operations (Nevins 2010)
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- Language-specific feature nodes and features (Morén 2006; Iosad 2012; Youssef 2013)
Other concepts of locality are not determined by a single principle:

- Search and copy operations (Nevins 2010)
- Language-specific feature nodes and features (Morén 2006; Iosad 2012; Youssef 2013)
- Constraints that limit targets to a set of segments (Jurgec 2011, and below)
The larger questions

1. How to capture this distinction between targets and transparent segments?
2. What kind of representations and constraints are involved?
3. Is consonant harmony special?
The proposal

- Locality is entirely up to constraints/constraint interaction.
Localilty, transparency, and targets

The proposal

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- Three basic ideas (Jurgec 2011):
Locality, transparency, and targets

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- Three basic ideas (Jurgec 2011):
  1. Target preference: Some segments are better targets than other segments.
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  2. Trigger-target similarity: Dissimilar segments can be excluded from the set of targets

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Locality, transparency, and targets

The proposal

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- Three basic ideas (Jurgec 2011):
  1. Target preference: Some segments are better targets than other segments
  2. Trigger-target similarity: Dissimilar segments can be excluded from the set of targets
  3. Trigger preference: Some segments are better triggers than other segments
Locality, transparency, and targets

Target preference

Vowels and consonants display an asymmetry:
Locality, transparency, and targets

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Vowels and consonants display an asymmetry:

- Vowels are more easily affected by neighboring consonants (undershoot; Lindblom 1963), than vice versa.
Locality, transparency, and targets

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Locality, transparency, and targets

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- Vowels are more easily affected by neighboring consonants (undershoot; Lindblom 1963), than vice versa.
- This phonetic effect can be phonologized.
- Vowels assimilate more easily than consonants. ≡ Vowels are better targets than consonants.
Locality, transparency, and targets

Target preference

Vowels and consonants display an asymmetry:

- Vowels are more easily affected by neighboring consonants (undershoot; Lindblom 1963), than vice versa.
- This phonetic effect can be phonologized.
- Vowels assimilate more easily than consonants. Vowels are better targets than consonants.
- This can be best seen at a distance, where the effect is less strong.
**Locality, transparency, and targets**

### Assimilation with transparent segments

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TRIGGER</th>
<th>TRANSP</th>
<th>TARGET</th>
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<tbody>
<tr>
<td>a.</td>
<td>V</td>
<td>X</td>
<td>V</td>
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<td>b.</td>
<td>C</td>
<td>X</td>
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<td>c.</td>
<td>V</td>
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**Example Processes (Language)**

- a. V X V: Vowel harmony (Wolof, Twi)
- b. C X C: Consonant harmony (many)
- c. V C<sub>i</sub> C<sub>j</sub>: Some cases of nasal harmony (Mòbà)
- d. C C V: Emphasis spread (Arabic), V flattening (Chilcotin)
- e. V V C
- f. C V<sub>i</sub> V<sub>j</sub>: FaucaI harmony (Snhitsu?umshtsn)

Transparent Vs are avoided. Transparent Vs imply transparent Cs.

What is the best way to capture this tendency?
Locality, transparency, and targets

Transparent Vs imply transparent Cs


- What is the best way to capture this tendency?

- Most of the pre-OT accounts make use of a representational approach.

What is the best way to capture this tendency?

Most of the pre-OT accounts make use of a representational approach.

Here, I make use of OT constraints that refer to autosegmental representations.
Towards a perfect spreading constraint
Towards a perfect spreading constraint

Parameters:

1. preference for vocalic targets
2. directionality (Baković and Rose, yesterday)
3. domain boundedness
Towards a perfect spreading constraint

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  2. directionality (Baković and Rose, yesterday)
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- These parameters are not specific to spreading, but can be found in various components of ABC.
Towards a perfect spreading constraint

- **Parameters:**
  1. preference for vocalic targets
  2. directionality (Baković and Rose, yesterday)
  3. domain boundedness

- These parameters are not specific to spreading, but can be found in various components of ABC.

- I propose a single class of constraints that combine the effects of both previous approaches.
Licensed Alignment

- Insight: spreading prefers certain kinds of segments (licensing) and domain edges (alignment).
- This new kind of constraints was first proposed for stress by Hyde (2008/2012) and extended to segmental features by Jurgec (2011).

- Template:
  \[\langle \text{domain}, \text{F}, \text{cat} \rangle / \text{domain} \]
  \[\text{F} \quad \text{cat}\]

Assign a violation mark for every triplet \(\langle \text{domain}, \text{F}, \text{cat} \rangle\), when F precedes cat within the domain.
On third categories

- For every feature, there is a set of Licensed Alignment constraints that differ solely in the third category.
- Third categories exclude non-prominent positions.
- Abstracted example:
  1. $^*\omega[F, \times]$
     $^*\langle PWd, F, \times \rangle$ / $\text{P}Wd$
     $[F]$ \times
   2. $^*\omega[F, V]$
     $^*\langle PWd, F, V \rangle$ / $\text{P}Wd$
     $[F]$ $V$
Locality in assimilation

- Assimilation prefers vocalic to consonantal targets.
- Targets by segment type (directionality irrelevant)

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- Vowel harmony (Wolof, Twi)
- Consonant harmony (many)
- Some cases of nasal harmony (Mòbà)
- Emphasis spread (Arabic), vowel flattening (Chilcotin) (unattested)
- Faucal harmony (Snchitsu?umshtsn)

- No case of assimilation triggered by a V targets a distant C.
Spreading to consonants across vowels ruled out

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<td>*ω[F,×]</td>
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| ⟨ω,[F],V_i⟩! |       |       | **    |
Licensed Alignment constraints are a powerful tool that can restrict the locality of assimilation.

As we have seen, assimilation prefers vocalic targets to consonantal ones, all other things being equal.

Licensed Alignment constraints allow a way to capture such preference.

Licensed Alignment can capture other properties of assimilation (directionality, domains).
Arguments against spreading

- Two main arguments against spreading (Hansson 2001; Rose & Walker 2004):
  1. Mysterious harmony
     Consonant harmony seemingly applies across segments that have the feature that spreads. Other kinds of assimilation do not seem to work that way.
  2. Similarity
     Consonant harmony affects a (small) subset of consonants, whereas other kinds of assimilation typically affect all segments, all obstruents, or all vowels.
Consonant harmony ruled out?

- Consonant harmony is an attested pattern.
- Licensed Alignment rules out consonant harmony.
- How can we nevertheless account for consonant harmony?
- The idea is that assimilation affects similar segments.
Consonant harmony

Similarity in phonology

- \{Suzuki 1998; Mackenzie 2009; Wayment 2009; Gallagher 2010; Arsenault 2012\}

- Many phonological processes affect a subset of segments that share a common feature.

- Assimilation is often limited to targets that are similar to triggers.

- Consonant harmony inherently affects a subset of similar consonants.
Accounting for similarity

- There are several constraints proposed for consonant harmony.
- In ABC, similar segments are in correspondence.
- Here I propose a modification of one frequently used constraint in assimilation—agreement.
Classic Agreement and beyond

- **AGREE[voice]**
  Adjacent segments must have the same value of the feature [voice]. (Baković 2000, see also Lombardi 1999; Blaho 2008)
Classic Agreement and beyond

- **AGREE[voice]**
  
  Adjacent segments must have the same value of the feature [voice]. (Baković 2000, see also Lombardi 1999; Blaho 2008)

- The definition includes reference to three variables: one feature and two segments.

- **AGREE[voice]** is satisfied in three situations: (i) by two adjacent segments that are voiced or (ii) voiceless, and (iii) by any two non-adjacent segments.
Classic Agreement and beyond

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- **Agree[voice]** is satisfied in three situations: (i) by two adjacent segments that are voiced or (ii) voiceless, and (iii) by any two non-adjacent segments.

- The constraint can be satisfied by epenthesis only when the adjacent consonants have different voicing. This is a pathology!
I propose two modifications of agreement constraints:
I propose two modifications of agreement constraints:

→ Agreement should explicitly refer to two features rather than one.

→ Adjacency should be dropped completely from the definition. This is possible in the current approach is that locality is already established by Licensed Alignment constraints, which I intend to use together with agreement.
Modifying agreement

- **AGREE**[F,G]
  A root node is associated with [F] and [G] iff all root nodes associated with [F] are also associated with some [G].
Modifying agreement

- **AGREE[F,G]**
  A root node is associated with [F] and [G] iff all root nodes associated with [F] are also associated with some [G].

- Some observations:
  1. **AGREE[F,G]** refers to two features.
  2. **AGREE[F,G]** is not identical to **AGREE[G,F]**.
  3. **AGREE[F,G]** is vacuously satisfied by no spreading.
Modifying agreement

- **AGREE**\([F,G]\)
  
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  1. **AGREE**\([F,G]\) refers to two features.
  2. **AGREE**\([F,G]\) is not identical to **AGREE**\([G,F]\).
  3. **AGREE**\([F,G]\) is vacuously satisfied by no spreading.

- Agreement makes sense only in combination with licensed alignment.
Kalasha retroflex harmony (Arsenault & Kochetov 2011)

1. Retroflex harmony
2. Applies if both the trigger and the target are identical in terms of continuancy.

<table>
<thead>
<tr>
<th>1&lt;sup&gt;st&lt;/sup&gt; Coronal is Retroflex</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; Cor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FRICATIVE</strong></td>
<td><strong>STOP</strong></td>
</tr>
<tr>
<td>şuṣiṣik 'to dry'</td>
<td>✓</td>
</tr>
<tr>
<td>ṭusu djek 'to peck'</td>
<td>□</td>
</tr>
<tr>
<td>şit 'tight-fitting'</td>
<td>□</td>
</tr>
<tr>
<td>tʰet karik 'to scatter'</td>
<td>✓</td>
</tr>
</tbody>
</table>
Analyzing Kalasha

- Kalasha is case of retroflex harmony.
- One way to analyze this situation is to say that this pattern involves two binary features, [−anterior] and [−distributed] (e.g. Johnson 1972; Schein & Steriade 1986).
- An alternative is to use a privative feature [retroflex].
- The licensed alignment constraint requires spreading of [retroflex] to root nodes (spreading to syllable nuclei will not work).

\[ *\text{root[retroflex, } \times \text{]} / \text{root} \]

\[ *\langle \text{root, [rx], } \times \rangle / [\text{rx}] \times \]
Agreement constraints

- Several agreement constraints are required in Kalasha:
  - **AGREE[retroflex,coronal]**
    A root node is associated with [retroflex] and [coronal] iff all root nodes associated with [retroflex] are also associated with some [coronal].
  - **AGREE[retroflex,sonorant]**
    A root node is associated with [retroflex] and [sonorant] iff all root nodes associated with [retroflex] are also associated with some [sonorant].

- Combined, retroflex harmony is limited to coronal obstruents.
Coronal harmony

\[
\begin{array}{c|c|c|c|c}
\text{[rx]} & /t\text{ a t n a k}/ & \text{\text{AGREE}[rx,cor]} & \text{\text{AGREE}[rx,son]} & \text{*rt[rx,×]} & \text{DEPLINK} \\
\hline
\text{[rx]} & t \text{ a t n a k} & & & & \\
\text{[son]} & [son] & [son] & [son] & & \\
\text{a.} & & & & & \\
\hline
\text{[rx]} & t \text{ a t n a k} & & & & \\
\text{[son]} & [son] & [son] & [son] & & \\
\text{b.} & & & & & \\
\hline
\text{[rx]} & t \text{ a t n a k} & & & & \\
\text{[son]} & [son] & [son] & [son] & & \\
\text{c.} & & & & & \\
\hline
\end{array}
\]

Peter Jurgec
University of Toronto
Consonant harmony as feature spreading
Multiple parasitism

- Harmony in Kalasha applies only to coronal obstruents.
- Many cases have consonant harmony that applies regardless of whether the affected segments are triggers or targets (Koyra, Aari, Chumash).
- Kalasha exhibits additional, parasitic restrictions.
- Retroflex harmony applies only if the trigger and the target are both stops or both fricatives. To distinguish between the two, another agreement constraint is required: Agree[retroflex, continuant].
Parasitic consonant harmony

Alignment prefers harmony

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{[rx]} & \\ \\
\text{[son]} & \text{[son]} & \\ \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{AGREE} & \text{AGREE} & \text{rt}\text{[rx, x]} & \text{DEPLINK} \\
\text{[rx, son]} & \text{[rx, cont]} & \text{****!} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{[rx]} & \\ \\
\text{[son]} & \text{[son]} & \\ \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{AGREE} & \text{AGREE} & \text{rt}\text{[rx, x]} & \text{DEPLINK} \\
\text{[rx, son]} & \text{[rx, cont]} & \text{****!} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{[rx]} & \\ \\
\text{[son]} & \text{[son]} & \\ \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{AGREE} & \text{AGREE} & \text{rt}\text{[rx, x]} & \text{DEPLINK} \\
\text{[rx, son]} & \text{[rx, cont]} & \text{****!} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{[rx]} & \\ \\
\text{[son]} & \text{[son]} & \\ \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\text{[cont]} & \text{[cont]} & \text{[cont]} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{AGREE} & \text{AGREE} & \text{rt}\text{[rx, x]} & \text{DEPLINK} \\
\text{[rx, son]} & \text{[rx, cont]} & \text{****!} & \\
\end{array}
\]
Parasitic consonant harmony

- Agreement prefers similarity

![Diagram](attachment:image.png)

Kalasha

Peter Jurgec
University of Toronto

Consonant harmony as feature spreading
Kalasha shows consonant harmony that is multiply parasitic. Licensed Alignment prefers spreading to all segments, whereas agreement restricts spreading to similar consonants. A spreading account of consonant harmony is possible (contra Hansson 2001; Rose 2004; Arsenault & Kochetov 2011; Nevins 2010). The same pattern is observed in parasitic vowel harmony.
Alignment + agreement model makes other predictions:

- Parasitic harmony is not limited to consonants.
- Spreading of one feature can result in epenthesis of another feature.
### Parasitic vowel harmony

#### Yowlumne rounding harmony (Kuroda 1967)

1. **Rounding harmony**
2. Applies only if the trigger and the target are identical in vowel height.

<table>
<thead>
<tr>
<th>1&lt;sup&gt;st&lt;/sup&gt; Vowel is Rounded</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>muṯ-hun</strong>&lt;sup&gt;1&lt;/sup&gt; ‘swear. AORIST’</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td><strong>muṯ-taw</strong>&lt;sup&gt;1&lt;/sup&gt; ‘swear. NDIR. GER’</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td><strong>gop-hin</strong> ‘take care. AORIST’</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td><strong>gop-tow</strong> ‘take care. NDIR. GER’</td>
<td>☑</td>
<td>☐</td>
</tr>
</tbody>
</table>

---

<sup>1</sup> Peter Jurgec  
University of Toronto  
Consonant harmony as feature spreading
Parasitic vowel harmony

Analyzing Yowlumne

- Licensed Alignment constraint prefers vocalic targets.
- $^*\omega[\text{round}, V]$
  $^*\langle \text{PWd, [rd], V} \rangle / \text{PWd}$
    
    \[ \text{[rd]} \quad \text{V} \]

- An agreement constraint favors the same height.
- \text{AGREE}[\text{round, high}]
  A root node is associated with [round] and [high] iff all root nodes associated with [round] are also associated with some [high].
Parasitic vowel harmony

High vowel + high vowel = harmony

\[
\begin{array}{c|c|c|c}
[r] & / \text{mut'\text{-hi\text{n}}} / & \text{AGREE[rd,hi]} & \ast\omega[rd,V] & \text{DEPLINK[rd]} \\
[\text{h}] & [\text{h}] & \ast! & \ast & \\
\end{array}
\]

a. [r] \text{mut'\text{-hi\text{n}}} [\text{h}] [\text{h}]

b. [r] \text{mut'\text{-hun}} [\text{h}] [\text{h}]
Parasitic vowel harmony

**Low vowel + low vowel = harmony**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>[r]</td>
<td>/gɔp-təw/</td>
<td>[l]</td>
<td>[l]</td>
</tr>
<tr>
<td></td>
<td>AGREE[rd, hi]</td>
<td>*ω[rd, V]</td>
<td>DEPLINK[rd]</td>
</tr>
</tbody>
</table>

a.  

<p>| | | | |</p>
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<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[r]</td>
<td>gɔp-təw</td>
<td>[l]</td>
<td>[l]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

b.  

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[r]</td>
<td>gɔp-tɔw</td>
<td>[l]</td>
<td>[l]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>
Parasitic vowel harmony

High vowel + low vowel = no harmony

<table>
<thead>
<tr>
<th>[r]</th>
<th>/ m u t' - t a w /</th>
<th>[h]</th>
<th>[l]</th>
<th>AGREE[rd,hi]</th>
<th>*ω[rd,V]</th>
<th>DEPLINK[rd]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>[r]</td>
<td>m u t' t a w</td>
<td>[h]</td>
<td>[l]</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>[r]</td>
<td>m u t' t o w</td>
<td>[h]</td>
<td>[l]</td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

Consonant harmony as feature spreading
Interim summary

- The same agreement constraint can account for similarity in vowel and consonant harmony.
- The crucial distinction is that vowel harmony can be parasitic or not, whereas consonant harmony is always parasitic.
Tamajaq Tuareg sibilant harmony

Tamajaq Tuareg displays sibilant (voicing and minor place) harmony (Alojaly 1980, Hansson 2010).

Harmony applies across voiced and voiceless obstruents:

/s-əβzəg/ → [z-əbzəg] ‘cause to panic’
/s-əκləzʲ/ → [z-əkʟəzʲ] ‘cause to invent’
/s-əнтəz/ → [z-əнтəz] ‘cause to extract’
/s-əf:ən3əɬ/ → [3-ək_:ən3əɬ] ‘tear one’s nose, ear’
/s-əg3əɬ/ → [3-əg3əɬ] ‘cause to remain’
/s-ək:əɬət/ → [3-ək:əɬət] ‘cause to saw’
The significance of Tamajaq Tuareg

- Hansson’s (2010) argument: obstruents are contrastively voiced, hence there is no way to capture harmony with spreading.
The significance of Tamajaq Tuareg

- Hansson’s (2010) argument: obstruents are contrastively voiced, hence there is no way to capture harmony with spreading.

- Several solutions:
  1. Spreading of voice to sibilants + fusion with any intervening voiced obstruents
  2. Spreading of [anterior]/[posterior] and epenthesis of [voice] under the pressure of AGREE constraints.
### Agree prefers [voice] epenthesis

<table>
<thead>
<tr>
<th></th>
<th>/ səɡᵽuɫəz/</th>
<th>Agree[ant, voi]</th>
<th>Agree[ant, sib]</th>
<th>*ω[×, ant]</th>
<th>DepLink[ν]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>[ant]</td>
<td>[ant]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sib]</td>
<td>[sib]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>**[ant]</td>
<td>**[ant]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sib]</td>
<td>[sib]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>[ant]</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sib]</td>
<td>[sib]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>**[ant]</td>
<td>**[ant]</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sib]</td>
<td>[sib]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>[ant]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sib]</td>
<td>[sib]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>**[ant]</td>
<td>**[ant]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sib]</td>
<td>[sib]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Peter Jurgec  
University of Toronto  
Consonant harmony as feature spreading
Tamajaq Tuareg summary

Tamajaq Tuareg involves:

1. spreading [posterior]/[anterior] to sibilants
2. voicing epenthesis under the pressure of AGREE constraints

Prediction:

- as long as one feature spreads
- ... other features can epenthesize/delete
Now that we have seen how consonant harmony works in a spreading account, let us look some of more challenging predictions of ABC.
Now that we have seen how consonant harmony works in a spreading account, let us look some of more challenging predictions of ABC.

There is a fundamental ontological difference between feature spreading and correspondence.

- **CORR-C ↔ C** (Rose & Walker 2004:491)
  
  Let S be an output string of segments and let $C_i$, $C_j$ be segments that share a specified set of features F. If $C_i$, $C_j \in S$, then $C_i$ is in a relation with $C_j$; that is, $C_i$ and $C_j$ are correspondents of one another.

- Both spreading and correspondence are formal relations.
Now that we have seen how consonant harmony works in a spreading account, let us look some of more challenging predictions of ABC.

There is a fundamental ontological difference between feature spreading and correspondence.

- \( \text{Corr-C} \leftrightarrow \text{C} \) (Rose & Walker 2004:491)
  
  Let \( S \) be an output string of segments and let \( C_i, C_j \) be segments that share a specified set of features \( F \). If \( C_i, C_j \in S \), then \( C_i \) is in a relation with \( C_j \); that is, \( C_i \) and \( C_j \) are correspondents of one another.

- Both spreading and correspondence are formal relations.
- However, only spreading has a (direct, straightforward) phonetic equivalent.
Serial Correspondence

One way to flesh out this difference between feature spreading and correspondence is to look how ABC works in another variety of OT, such as Harmonic Serialism.
ABC in Harmonic Serialism

Serial Correspondence

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- Gen in Harmonic Serialism generates only those candidates that differ from the input by one single operation.
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- Gen in Harmonic Serialism generates only those candidates that differ from the input by one single operation.
  - One possibility is that correspondence comes for “free”, i.e. it does not count as an independent operation.
  - Alternatively, establishing correspondence is a single step, but this is difficult to formalize.
Serial Correspondence

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- Gen in Harmonic Serialism generates only those candidates that differ from the input by one single operation.
  - One possibility is that correspondence comes for “free”, i.e. it does not count as an independent operation.
  - Alternatively, establishing correspondence is a single step, but this is difficult to formalize.

- Regardless of which option we take, parallel ABC fails to predict consonant harmony.
Example: Sibilant harmony

- **Step 1:** sasaf → saʃaf

<table>
<thead>
<tr>
<th></th>
<th>CORR-C↔C</th>
<th>IDENT-CC</th>
<th>IDENT-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>/sasaf/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. 😞 s;af;af</td>
<td>*<em>/</em></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. ☹ s;af;af</td>
<td>*<em>/</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. s;af;af</td>
<td>**</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>d. s;af;af</td>
<td>**</td>
<td></td>
<td></td>
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</tbody>
</table>

- **Problem:** Multiple targets require multiple steps. A single change does not improve harmony.
Sibilant Harmony, cont’d

- ABC in HS generates a sour-grapes pattern.
- Step 1: $sa\mathbf{a}s \rightarrow \mathbf{a}s\mathbf{a}s$

<table>
<thead>
<tr>
<th>/sa\mathbf{a}s/</th>
<th>CORR-C$\leftrightarrow$C</th>
<th>IDENT-CC</th>
<th>IDENT-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $\mathbf{a}s\mathbf{i}a\mathbf{a}s\mathbf{i}$</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. $s_i\mathbf{a}s\mathbf{i}a\mathbf{a}s\mathbf{i}$</td>
<td></td>
<td></td>
<td>**/  *</td>
</tr>
<tr>
<td>c. $s_i\mathbf{a}s\mathbf{i}a\mathbf{a}s\mathbf{i}$</td>
<td></td>
<td>**/  *</td>
<td></td>
</tr>
<tr>
<td>d. $s_i\mathbf{a}s\mathbf{j}a\mathbf{a}s\mathbf{j}$</td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

- The problem is confounded when we consider other consonant combinations (Hansson 2007).

Peter Jurgec
University of Toronto
Consonant harmony as feature spreading
ABC in Harmonic Serialism

A persistent problem

- Tier-based strict locality (Heinz 2010, Hansson yesterday) displays the same pathology:

  - **Step 1:** $\text{sas}aʃ \rightarrow saʃaʃ$

<table>
<thead>
<tr>
<th>/sas}ʃ/</th>
<th>$^*sʃ$ [sibilant]</th>
<th>IDENT-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 😞 saʃaʃ</td>
<td>*</td>
<td>*!</td>
</tr>
<tr>
<td>b. 🕋 sas}ʃ</td>
<td>*</td>
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</tbody>
</table>
ABC in Harmonic Serialism

Interim summary

- ABC cannot be easily extended to Harmonic Serialism.
- Main challenge: partial agreement does not improve harmony.
- Spreading-based alternatives do not face the same challenges (McCarthy 2011; Kimper 2012).
Dissimilar assimilation

**Dissimilarity requirements**

- Not all types of assimilation target similar segments.
- Some cases involve a target than **must** be different from a trigger.
- **Dissimilar assimilation:**
  1. all types of consonant-vowel assimilation
  2. some cases of metaphony and umlaut (Walker 2011)
Dissimilarity requirements

- These cannot be captured by similarity-based approaches alone.
- For example, CV interactions in Harari are triggered by non-ABC constraints (Rose 2004; Craioveanu & Godfrey yesterday).
- Argument from parsimony: if spreading is enough to capture all kinds of assimilation, agreement is not necessary (Jurgec 2013).
Conclusions

- I have reviewed two main arguments against spreading: mysterious harmony and similarity. None of them are unique to consonant harmony.

- I have argued that locality in assimilation is the result of two pressures:
  1. vocalic targets are better than consonantal targets
  2. similar targets are better than dissimilar targets

- These tendencies can be captured by a spreading account, which also predicts that consonant harmony will generally be parasitic, but vowel harmony may be parasitic or not.
Conclusions, cont’d

- A spreading account allows for epenthesis/deletion of another feature.
- I have provided two arguments against ABC:
  1. ABC cannot be straightforwardly extended to Harmonic Serialism (whereas spreading can be)
  2. ABC cannot account for dissimilar assimilation (whereas spreading can).
Consonant harmony as feature spreading

Peter Jurgec

University of Toronto

ABC↔Conference ~ UC Berkeley ~ May 19, 2014


<table>
<thead>
<tr>
<th>Introduction</th>
<th>Mysterious harmony</th>
<th>Relativized locality</th>
<th>Similarity</th>
<th>Similarity+</th>
<th>Challenges for ABC</th>
<th>Conclusions</th>
<th>References</th>
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