Directionality and Prosodic Asymmetries in Servigliano Italian Vowel Copy

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0. Introduction

(1) Background: Constraint types proposed to contribute to directionality and control in vowel harmony:

- Faithfulness between stems and their affixed forms (achieving cyclicity) (Baković 2000).

(2) Issue: Despite this variety of approaches, obtaining certain directionality effects and control in vowel harmony remains elusive (see also Hyman 2002, Sasa 2003).

Case study: Servigliano Italian vowel copy

(3) Basic facts:

- Full vowel copy harmony propagates regressively among sequences of unstressed vowels.
- Vowels that control harmony are (a) final in the clitic group constituent, i.e. a final stem vowel or enclitic vowel, and (b) the last proclitic vowel.

Schematically:

C = clitic group (Nespor & Vogel 1986, Hayes 1989)

i. Vowel copy initiated by final vowel in C

Exx.

\[ \ldots \sigma \sigma_{\text{stem}} \sigma \sigma_{C} \rightarrow \text{mèt-}a=\text{çà=la} \]

'put it (f sg)'

ii. Vowel copy initiated by last proclitic

\[ \sigma \sigma \sigma \sigma_{\text{stem}} \sigma \sigma \ldots \rightarrow \text{mè=ss-}a=\text{pij-a} \]

(V copy occurs)

'he takes it (f sg) from me'

\[ \sigma \sigma \sigma \sigma_{\text{stem}} \sigma \sigma \ldots \rightarrow \text{çè=fač-imo} \]

'(No V copy)

'we make ourselves'

(4) Problems:

- Regressive copy does not follow from ALIGN-Left(F) or SPREAD-Left(F).
- Trigger control cannot be attributed to strong syllable faith.
- Trigger control and regressive copy do not follow from Stem - Affixed Form faith.

(5) Preview of proposal

- Part I: Domain
  Vowel copy harmony operates among the most prosodically weak vowels.
  a. Prominence scale (Italian varieties):
     \[ V/\theta > V/\text{Pretonic-Stem-}\theta > V/\theta \]
  b. ALLsL & IDENT-IO(F)
     “If a syllable violates ALLsL, it must obey IDENT-IO(F), and vice versa.”

- Part II: Directionality
  Regressive directionality arises from local conjunction of a constraint aligning syllables to the left edge of the clitic group constituent and IDENT(F). This attracts unfaithful vowels towards the left.

(6) Organization

- §1 - Data – Servigliano Italian vowel copy harmony.
- §2 - Analysis.
- §3 - Alternatives.
- §4 - Conclusion and further issues.

1. Servigliano Italian – Data

- Servigliano Italian is spoken in the extreme south of the Marches. Data and description are based on Camilli (1929), Maiden (1995) and Nibert (1998).

(7) Vowel inventory:

\begin{tabular}{|c|c|c|}
\hline
Front & Back \\
\hline
High & i & u \\
Mid & e & o \\
Low & ë & ò \\
\hline
\end{tabular}

(8) Unstressed mid vowel neutralization:

- Mid vowels [i, ë] regularly raise to [e, ë] when unstressed (as in Standard Italian).

(9) Stress:

- Main stress falls on one of the last three syllables of the word, excluding enclitics.
1.1 Vowel Copy Harmony in Post-tonic Vowels

Facts
• Unstressed post-tonic vowels fully assimilate to the final vowel in the clitic group constituent.
• Trigger vowel may be a stem vowel or a clitic vowel.
• Copy occurs for all five unstressed vowel qualities.
• A stressed vowel blocks copy harmony.
(Below “-” denotes affixes and “=” clitics.)

(10) **Vowel copy controlled by final stem vowel**

a. **Verb**
   - prédık-o 'I preach'
   - prédık-a 'he preaches'
   - prédık-i 'you preach'
   - predık-á 'to preach'
   - cf. predık-á 'to preach'
   - [e] → [é] by metaphonic raising

b. **Noun**
   - pěržak-a 'peach tree'
   - pěržak-u 'peach'
   - pěržk-i 'peaches'
   - doménæk-a 'Sunday'
   - doménnek-e 'Sundays'

(11) **Vowel copy controlled by final clitic vowel**

a. **Verb**
   - métt-a=čà 'put it (f sg)
   - métt-e=čàe 'put it (f pl) there'
   - mítt-u=čà 'put it (m sg) there'
   - mítt-i=čài 'put it (m pl) there'
   - cf. /mett-i/ 'put'
   - cf. če 'there'

b. **Noun**
   - stómmuk-u 'stomach'
   - stómmik-i 'stomachs'
   - párd-u=tu 'your father'
   - cf. párd- ‘father’
   - mátr-a=ta 'your mother'
   - cf. mátr- ‘mother’

1.2 Vowel Copy Harmony in Proclitic Vowels

Facts
• Unstressed proclitic vowels fully assimilate to the final proclitic vowel (14a).
• A stressed vowel blocks copy harmony (14b).
• Copy does not affect pretonic stem vowels, nor do they initiate copy (14c).

(14) **Vowel copy controlled by final proclitic vowel**

a. tğ=lo=dík-o ‘I tell it (neut) to you (sg)’
   - čç=li=métt-o ‘I put it (m pl) there’
   - ttu=lu=šign-a ‘he marks it (m pl) down for you (sg)’
   - cf. te ‘to you’
   - cf. če ‘there’

b. mè=ssg=la=píjj-a ‘he takes it (f sg) from me’
   - te=čç=le=dašk-o ‘I give it (neut) to you (sg)’
   - me=tt=ssg=la=píjj-a ‘he takes it (f sg) from me’
   - cf. se = reflexive pro.
   - cf. čè = reiterative pro.

(12) **Other vowel harmony in Servigliano**
In addition to vowel copy harmony, two other vowel harmony processes occur:

i. **Metaphony**: Post-tonic high vowels raise a stressed mid vowel, e.g. /e, o/ → [e, o] and /e, o/ → [i, u].

ii. **Stress-triggered raising**: Stressed high vowels raise preceding mid vowels.
A comprehensive analysis is developed by Walker (in prep.) (cf. Nibert 1998).

(13) **Vowel copy and raising harmonies are distinct processes**
• Direction of height change:
  - Vowel copy can produce vowel lowering or raising.
  - Metaphony and stress-triggered harmonies cause raising only.
• Other features:
  - Only vowel copy enforces full identity, i.e. color features also assimilate.
  - Role of stress:
    - Vowel copy operates strictly among unstressed vowels.
    - In raising harmonies, the stressed syllable functions as target or trigger.
Summary: Servigliano vowel copy harmony

- Full vowel assimilation across syllables.
- Strictly regressive (leftward).
- Operates among unstressed vowels in the clitic group constituent, excluding pretonic stem vowels.
- Stressed vowels block copy harmony.

2 Analysis

2.1 Triggers and the Harmony Domain

Descriptive terminology

\[
\begin{array}{cccc}
\text{Proclitic} & \text{Pretonic stem} & \text{Stressed stem} & \text{Post-tonic (post-tonic stem + enclitic)} \\
S & \sigma & [\sigma]_{\text{STM}} & [\sigma]_{\text{C}} \\
\end{array}
\]

Proposal
Vowel copy operates among prosodically weakest vowels in the language.

- Unstressed vowels are less prominent than stressed (e.g., shorter, lower amplitude).
- Pretonic stem vowels show evidence of strength intermediate between stressed vowels and other unstressed vowels in Italian dialects.
  - In many Italian dialects, pretonic vowels show moderate reduction, while post-tonic vowels show extreme reduction, i.e., they are extra-short. Exx.: Southern Lucanian, Sant’ Oreste (Lazio) (Crosswhite 2000, to appear, Maiden 1995).
  - Several central Italian dialects delete post-tonic syllables, but not pretonic syllables in vocative forms.
  - In the northern Salentino dialect, neutralizing round and back harmony operates among post-tonic syllables but not pretonic ones (Sluyters 1988).

Prominence scale (Italian varieties):
- V/Strong (\(\sigma\)) > V/Weak (Pretonic stem) > V/Extra-Weak (Post-tonic, Unstressed clitic)

AGREE-\(\sigma_{\text{XWEAK}}\) (V-Feature)
Adjacent extra weak vowels must have the same specification for V-Features.

Maximizing V-to-V coarticulation might play a motivating role here.

2.2 Directionality

Proposal
Directionality is an effect of local conjunction of ALIGN and IDENT constraints operating over syllables.

Local conjunction
Let Con1 and Con2 be constraints and D be a given domain. Then:
\[
\text{Con1} &_{D} \text{Con2} \text{ is violated when there is some } D \text{ in which both Con1 and Con2 are violated.}
\]

Functional motivations for vowel copy harmony

(20) Perceptual
- Unstressed vowels are perceptually weak.
  - Perceptibility is improved by extending the duration of gestures across multiple syllables.

(21) Rhythmic
- Italian is argued to disfavor successions of durational contrasts in its syllables, suggested to assist in perception of the language’s rhythm as syllable-timed (Farnetani & Kori 1990).
  - Among Farnetani & Kori’s findings:
    - Sequences of unstressed syllables in Italian are common (up to four syllables).
    - Within unstressed sequences, syllables do not vary much in length.
    - Absence of word-final lengthening and unsystematic occurrence of phrase-final lengthening contributes to uniformity of unstressed vowel duration.
    - Secondary stress in compounds is often not realized.
  - Vowel copy harmony contributes to consistency of duration in sequences of unstressed syllables, which contributes to syllable-timed rhythm.

(22) Articulatory
- Certain vowel harmonies are suggested to arise from maximizing V-to-V coarticulation and/or as a perceptual result of V-to-V coarticulation. (e.g. Ohala 1994, Steriade 1994, Majors 1998, Beddor et al. 2001, Kaun to appear.)
  - Maximizing V-to-V coarticulation might play a motivating role here.
(25) Schematic illustration


<table>
<thead>
<tr>
<th></th>
<th>Con1</th>
<th>Con2</th>
<th>Con1 &amp; Con2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cand1</td>
<td>*</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cand2</td>
<td>✓</td>
<td>*</td>
<td>✓</td>
</tr>
<tr>
<td>Cand3</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

- The above addresses cases where a candidate incurs a single violation with respect to each of the relevant constraints. Evaluation of a case where there is more than one violation is addressed below.

(26) The constraints

a. ALLsL: Align(s, L, C, L)
   The left edge of every syllable must conicide with the left edge of some clitic group constituent.

b. IDENT-IO(back)
   (likewise constraints exist for [round], [high], [low])
   Correspondent segments are identical in specification for [back].

(27) Local conjunction of above constraints

a. ALLsL & IDENT-IO(back)
   "If a syllable violates ALLsL, it must not violate IDENT-IO(back), and vice versa.
   The local conjunction of ALLsL and IDENT-IO(back) is violated when there is a given syllable which incurs a violation with respect to each of these constraints.
   c. The degree to which the local conjunction is violated is proportional to the degree of an offending syllable's misalignment.

(28) Illustration of assessment: (Dashed lines are for illustrative purposes only.)

```
/σ σ σ/                      IDENT(back)                      ALLσL                          ALLσL & σ IDENT(back)
[+B] [−B] [+B]               |
```

a. [ [ σ₁ ] σ₂STEM σ₃ ]C
   \[ +Bk \]
   σ₂ *
   σ₂ *
   σ₂ *

b. [ [ σ₁ ] σ₂STEM σ₃ ]C
   \[ -Bk \]
   σ₃ *
   σ₃ **
   σ₃ **

(29) Assessment of violations in (28)

Let Cᵢ-Marks(X) be the number of marks element X incurs with respect to constraint Cᵢ.

If σᵢ and σⱼ each violate ALLσL & σ IDENT-IO(back),
then ALLσL-Marks(σᵢ) > ALLσL-Marks(σⱼ).

(30) Results

• The local conjunction of ALLσL and IDENT(F) causes unfaithful syllables to be located as close to the left edge of the word as possible.
• Accomplishes leftward directionality in vowel copy harmony.

Advantages of a local conjunction approach to directionality in harmony

• Capitalizes on resources already available in the theory.
  - Edge sensitivity of ALIGN constraints.
  - Local conjunction of constraints.
  - Gradient assessment of ALIGN constraints (but see below).
• Compatible with AGREE and Syntagmatic Identity approaches (Baković 2000, Krämer 2001), as shown in (31). Hence its applicability is not limited to analyses of vowel harmony as spreading.

(31) Illustration: The output representations below both tie with respect to violations of ALLσL & σ IDENT(back). Forms in (a) and (b) each incur one violation.

```
Input: \[ σ σ σ \]
[+B] [-B] [+B]
Outputs: a. σ₁ σ₂ σ₃
[+B] [+B] [+B] b. σ₁ σ₂ σ₃
[+B] [+B] [+B]
```

Possible drawbacks

• Requires gradient constraint evaluation. McCarthy (2002) has called such assessment into question. Whether the directionality result can be maintained under an assumption of categorical alignment constraints remains to be seen.
• Might produce problematic effects at odds with positional faithfulness, because favors locus of faith violations at word-edges.
2.3 Constraint Ranking

- For each feature showing leftward harmony, there will be a local conjunction for all \( L \) and the identity constraint pertaining to that feature. For expositional convenience, IDENT-IO(V-feature) will be used as a cover constraint.

(32) \( \text{AGREE-} \sigma_{\text{XWeak}}(V-F) \gg \text{IDENT-IO}(V-F) \)
- Ranking necessary for vowel copy harmony to obtain alternations.

(33)

<table>
<thead>
<tr>
<th>/\text{c/}=\text{l/}=\text{m/}=\text{t/}=\text{o/}</th>
<th>\text{AGREE-} \sigma_{\text{XWeak}}(V-F)</th>
<th>\text{IDENT-IO}(V-F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( \hat{\text{c/}}=\text{l/}=\text{m/}=\text{t/}=\text{o/} )</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ( \hat{\text{c/}}=\text{l/}=\text{m/}=\text{t/}=\text{o/} )</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

(34) \( \text{AGREE-} \sigma_{\text{XWeak}}(V-F) \gg \text{ALL}\sigma L \& \sigma \text{IDENT-IO}(V-F) \)
- Ranking needed because copy can enforce violation of the local conjunction, i.e. it produces unfaithful syllables not perfectly aligned at the left word edge.

(35)

<table>
<thead>
<tr>
<th>/\text{m/}=\text{t/}=\text{c/}=\text{l/}=\text{a/}</th>
<th>\text{AGREE-} \sigma_{\text{XWeak}}(V-F)</th>
<th>\text{ALL}\sigma L &amp; \sigma \text{IDENT-IO}(V-F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( \hat{\text{m/}}=\text{t/}=\text{c/}=\text{l/}=\text{a/} ) Regressive copy</td>
<td>*! 1 , ** 2</td>
<td></td>
</tr>
<tr>
<td>b. ( \hat{\text{m/}}=\text{t/}=\text{c/}=\text{l/}=\text{a/} ) Progressive copy</td>
<td>** 2 , *** 3</td>
<td></td>
</tr>
<tr>
<td>c. ( \hat{\text{m/}}=\text{t/}=\text{c/}=\text{l/}=\text{a/} ) Bidirectional copy</td>
<td>*! 1 , *** 3</td>
<td></td>
</tr>
<tr>
<td>d. ( \hat{\text{m/}}=\text{t/}=\text{c/}=\text{l/}=\text{a/} ) No copy</td>
<td><em>!</em></td>
<td></td>
</tr>
</tbody>
</table>

(36) Summary: Analysis of Servigliano vowel copy harmony

Vowels that participate in copy harmony
- Weakest vowels in terms of prominence.
- Perceptibility: Harmony improves perceptibility of vowel quality in weakest positions.
- Rhythmic Uniformity: Copy harmony improves uniformity of syllable timing in sequences of unstressed vowels.
- Coarticulation: Copy harmony maximizes V-to-V coarticulation across unstressed syllables.

3. Alternatives

3.1 Directionality in Previous Approaches to Vowel Harmony

Leftward feature alignment or spreading

(37) \( \text{ALIGN-[back]-}L \)
- Align the left edge of every [back] feature with the left edge of the clitic group constituent.

Problem
- Will not accomplish leftward directionality here. Alignment constraints are evaluated over outputs only.

(38) Structures below both satisfy \( \text{ALIGN-[back]-}L \):

\[
\begin{align*}
\text{a. } & \left[ \text{métta} \right] \text{ w } \left[ \text{c/} & \text{a/} \right] \text{ w } \left[ \text{la/} \right] \text{ C} \\
\text{b. } & \left[ \text{métti} \right] \text{ w } \left[ \text{c/} & \text{i/} \right] \text{ w } \left[ \text{li/} \right] \text{ C} \\
\text{c. } & \left[ \text{métta} \right] \text{ w } \left[ \text{c/} & \text{e/} \right] \text{ w } \left[ \text{le/} \right] \text{ C}
\end{align*}
\]

Word-final faithfulness
- Word-final faith is argued to play a role in certain vowel harmony processes.

(39) \( \text{WF-IDENT-IO(F)} \)
- An output segment in the word final syllable and its input correspondent must have identical specifications for feature \([F]\).

Problem
- Does not determine which word-final syllable will control harmony.

(40) Structures below both each contain two syllables that violate \( \text{WF-IDENT-IO(F)} \):

\[
\begin{align*}
\text{a. } & \left[ \text{métta} \right] \text{ w } \left[ \text{c/} & \text{a/} \right] \text{ w } \left[ \text{la/} \right] \text{ C} \\
\text{b. } & \left[ \text{métta} \right] \text{ w } \left[ \text{c/} & \text{a/} \right] \text{ w } \left[ \text{la/} \right] \text{ C} \\
\text{c. } & \left[ \text{métta} \right] \text{ w } \left[ \text{c/} & \text{a/} \right] \text{ w } \left[ \text{la/} \right] \text{ C}
\end{align*}
\]
Further points

• Candidates (40a-c) will tie even if word-final faithfulness is used together with leftward feature alignment.

• Faithfulness to a clitic group final syllable would not resolve the problem because regressive harmony likewise holds in unstressed proclitic sequences.

Stem - affixed stem faithfulness

• Obtains certain directionality effects via “cyclicity” (Baković 2000).

(42) SA-IDENT[F]
A segment in an affixed form [Stem + affix] must have the same value of the feature [F] as its correspondent in the stem of affixation [Stem].

• Not applicable here. Vowel that controls harmony is rightmost in unstressed sequences – in many cases not contained within an embedded stem constituent.¹

3.2 Another Alternative: Expanding Edge Reference in Faithfulness

• Anchor constraints combine faithfulness with reference to edges (McCarty & Prince 1995).

• Example: LEFT-ANCHOR-IO: The left edge of the word in the input corresponds to the left edge of the word in the output.

• Versions of ‘Anchor’ constraints, which enforce faithfulness at the edge of a feature or a tone’s associations have been suggested (though not all are called anchoring constraints) (Cole & Kisseberth 1995, Myers 1997, Walker 2001b).

Edge-faithfulness for feature associations

(43) IDENT-IO(F)-Right
“The rightmost association of a feature is faithful.”

Let α be a segment in the input and β its correspondent in the output. If β is the rightmost segment to which a feature [F] is associated, then α and β must have identical specifications for [F].

(44) Output (a) below violates IDENT-IO(F)-Right but (b) obeys it:
Input: σ1 σ2
\[\begin{array}{c}
\text{[F]}[\text{+F}]
\end{array}\]
Output: a. σ1 σ2
\[\begin{array}{c}
\text{[F]}[\text{+F}]
\end{array}\]

Result
Regressive directionality results from requirement that right edge of feature’s associations be faithful.

Possible pros
• Possible functional motivation in tendency for coarticulation to be anticipatory.
• Has capacity to obtain a broader range of directionality effects in harmony than local conjunction.
  - Because the constraint that drives harmony enforces violation of the local conjunction (see (35)), the constraint driving harmony must be higher ranked to achieve a directionality effect.
  - Consequence: Directionality achieved via local conjunction cannot restrict satisfaction of harmony.

(45) IDENT-IO(Rd)-R >> AGREE(Rd) obtains regressive harmony

<table>
<thead>
<tr>
<th>a</th>
<th>IDENT-IO(Rd)-R</th>
<th>AGREE(Rd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 01 * 02 * 03 * a4</td>
<td>Regressive harmony</td>
<td>*</td>
</tr>
<tr>
<td>b. 01 * 02 * 03 * 04</td>
<td>Bidirectional harmony</td>
<td>!</td>
</tr>
<tr>
<td>c. a1 * a2 * 03 * a4</td>
<td>No harmony</td>
<td>**!</td>
</tr>
</tbody>
</table>

Observations:
• IDENT-IO(Rd)-R >> AGREE(Rd) obtains regressive harmony that limits satisfaction of AGREE.
• In contrast, ALLσL & IDENT-IO(Rd) >> AGREE(Rd) would select (45c), with no harmony (compare (35d)).
• Extent to which cases like (45a) exist for which directionality is not epiphenomenal remains to be seen.

Possible drawbacks
• Requires introduction of edge sensitivity into IDENT-IO constraints.
• Nelson (2003) has argued that right edges may not be targeted for anchoring, yet IDENT-IO(F)-Right might qualify as a kind of right-edge anchoring.
• Not compatible with analyses of harmony as feature matching rather than autosegmental spreading (see (46)).

(46) Output (a) below violates IDENT-IO(F)-Right but (b) obeys it:
Input: σ1 σ2
\[\begin{array}{c}
\text{[F]}[\text{+F}]
\end{array}\]
Output: a. σ1 σ2
\[\begin{array}{c}
\text{[F]}[\text{+F}]
\end{array}\]

¹ See Hansson (2001) for a proposal to capture leftward consonant harmony via targeted constraints. That proposal connects the preference for regressive assimilation to a hypothesized basis for consonant harmony in production planning – speech errors are most often anticipatory. Whether extension of this approach to vowel harmony is appropriate remains to be explored.
4. Conclusion and Further Issues

(47) **Directionality in Servigliano vowel copy harmony**
- Can be obtained via local conjunction of alignment and faithfulness.
- Uses resources and constraints already established in the theory.
- Locus of directionality: ALLOL, i.e. within alignment constraint.

(48) **Alternative approaches**
- Despite the edge-sensitivity in such constraints as ALIGN-[F]-L or Word-Final-
  IDENT(F), neither is capable of capturing leftward copy harmony in Servigliano.
- IDENT-IO(F)-Right has capacity to achieve leftward spreading. However, it
  involves complicating IDENT(F) constraints, and it is incompatible with certain
  theoretical approaches to harmony that do not assume autosegmental spreading.

(49) **Further research**
- Explore range of application of local conjunction of alignment and IDENT(F) and
  its typological implications.
- Examine issue of gradient versus categorical assessment of alignment in obtaining
  directionality of harmony.
- Further examine the definition of local conjunction and the assessment of marks
  in instances of multiple violations within a local domain.

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References


Smolensky, Paul. 1993b. On the constraint component Con of UG. Handout of talk presented at the University of Arizona.


