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:
• Feature alignment (e.g. Kirchner 1993, Akinlabi 1994, Cole & Kisseberth 1995, Pulleyblank 1996).
• 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.
[I ... œ œ[sTm œ œ]C métt-a=ča=la
    [F] 'put it (f sg)'

ii. Vowel copy initiated by last proclitic
C[œ œ œ[sTm œ œ ... ] me=sa=la=pij-a (V copy occurs)
  [F] 'he takes it (f sg) from me'

  ě=fač-imo (No V copy)
  'we make ourselves'

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/ë > V/Pretonic-Stem-ë > V/ë
  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.

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).

Vowel inventory:

<table>
<thead>
<tr>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
</tr>
<tr>
<td>Low</td>
<td>ě</td>
</tr>
</tbody>
</table>

(8) Unstressed mid vowel neutralization:
Mid vowels [e, œ] regularly raise to [e, o] 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**

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>prédık-o</td>
<td>'I preach'</td>
</tr>
<tr>
<td>prédák-a</td>
<td>'he preaches'</td>
</tr>
<tr>
<td>prédik-i</td>
<td>'you preach'</td>
</tr>
<tr>
<td>cf. predik-á</td>
<td>'to preach'</td>
</tr>
</tbody>
</table>

b. **Noun**

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>péršák-a</td>
<td>'peach tree'</td>
</tr>
<tr>
<td>péršák-u</td>
<td>'peach'</td>
</tr>
<tr>
<td>pérsik-i</td>
<td>'peaches'</td>
</tr>
<tr>
<td>doménнак-a</td>
<td>'Sunday'</td>
</tr>
<tr>
<td>doménneк-e</td>
<td>'Sundays'</td>
</tr>
</tbody>
</table>

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

a. **Verb**

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>mét-t=çè=la</td>
<td>'put it (f sg)'</td>
</tr>
<tr>
<td>mét-t=çè=le</td>
<td>'put it (f pl) there'</td>
</tr>
<tr>
<td>mét-t=çè=lu</td>
<td>'put it (m sg) there'</td>
</tr>
<tr>
<td>mét-t=çè=li</td>
<td>'put it (m pl) there'</td>
</tr>
<tr>
<td>cf. /mètt-i/ → mètt</td>
<td>'put'</td>
</tr>
<tr>
<td>cf. çè</td>
<td>'there'</td>
</tr>
</tbody>
</table>

b. **Noun**

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>stómnik-u</td>
<td>'stomach'</td>
</tr>
<tr>
<td>stómnik-i</td>
<td>'stomachs'</td>
</tr>
<tr>
<td>párδ-u=tu</td>
<td>'your father'</td>
</tr>
<tr>
<td>cf. párδ-g</td>
<td>'father'</td>
</tr>
<tr>
<td>mátr-a=tá</td>
<td>'your mother'</td>
</tr>
<tr>
<td>cf. mátr-g</td>
<td>'mother'</td>
</tr>
</tbody>
</table>

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. **Verb**

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tè=lo=dík-o</td>
<td>'I tell it (neut) to you (sg)'</td>
</tr>
<tr>
<td>tè=lo=mét-o</td>
<td>'I put it (m pl) there'</td>
</tr>
<tr>
<td>tè=lu=çè=li</td>
<td>'he marks it (m pl) down for you (sg)'</td>
</tr>
<tr>
<td>cf. e</td>
<td>'there'</td>
</tr>
</tbody>
</table>

b. **Noun**

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>mè=ssè=la=píjj-a</td>
<td>'he takes it (f sg) from me'</td>
</tr>
<tr>
<td>tè=çè=qo=lo=dak-o</td>
<td>'I give it (neut) to you (sg)'</td>
</tr>
<tr>
<td>me=ttè=ssè=la=píjj-a</td>
<td>'he takes it (f sg) from me'</td>
</tr>
<tr>
<td>cf. se = reflexive pro.</td>
<td></td>
</tr>
<tr>
<td>cf. çè = reiterative pro.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>jje=tum-ímo</td>
<td>'we cut it/them'</td>
</tr>
<tr>
<td>çè=faç-ímo</td>
<td>'we make ourselves'</td>
</tr>
<tr>
<td>stommekós-a</td>
<td>'nauseating (f sg)'</td>
</tr>
<tr>
<td>bokkal-ò</td>
<td>'foolish (m sg)'</td>
</tr>
<tr>
<td>bbisuñ-ímo</td>
<td>'we need'</td>
</tr>
</tbody>
</table>

(12) **Other vowel harmony in Servigiano**

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

\[
\begin{array}{c|c|c|c|c}
\text{Proclitic} & \text{Pretonic stem} & \text{Stressed stem} & \text{Post-tonic (post-tonic stem + enclitic)} \\
\hline
\end{array}
\]

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 (d) > V/Weak (Pretonic stem) > V/Extra-Weak (Post-tonic, Unstressed clitic)

AGREE-σXWeak(V-Feature)

Adjacent extra weak vowels must have the same specification for V-Features.

\[
\text{AGREE(F)} \text{ after Baković 2000. Could alternatively be formalized as an autosegmental SPREAD(F) constraint, e.g. Padgett 1995.)}
\]

- For expositional convenience, AGREE-(V-F) is a cover constraint for AGREE constraints pertaining to individual features: [back], [round], [high], [low].
- Restriction to (extra) weak vowels informed by functional motivations below.

Functional motivations for vowel copy harmony

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

- **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.

- **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.

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:

\[
\text{Con1} \& \text{D} \text{ Con2} \text{ is violated when there is some } D \text{ in which both Con1 and Con2 are violated.}
\]

(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(σ, L, C, L)
The left edge of every syllable must coincide 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.*

b. 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.)

<table>
<thead>
<tr>
<th>/σ σ σ/</th>
<th>IDENT(back)</th>
<th>ALLsL</th>
<th>ALLsL &amp; IDENT(back)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+B] [-B] [+B]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(29) **Assessment of violations in (28)**

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

If σ_i and σ_j each violate ALLsL & σ IDENT-IO(back),

IDENT(back)-Marks(σ_i) = IDENT(back)-Marks(σ_j),

and ALLsL-Marks(σ_i) > ALLsL-Marks(σ_j),

Then ALLsL & σ IDENT(back)-Marks(σ_i) > ALLsL & σ IDENT(back)-Marks(σ_j)

**Why conjoin ALLsL and IDENT(V-Feature) constraints?**

- Vowel features are properties of the syllable head, and they tend to overlap consonant strings in the syllable (e.g. Ohman 1966, Browman & Goldstein 1986 et seq).
- The constraints can be interpreted as sharing a common argument – the syllable.

(30) **Results**

- The local conjunction of ALLsL 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 ALLsL & σ IDENT(back). Forms in (a) and (b) each incur one violation.

**Input:**

<table>
<thead>
<tr>
<th>σ</th>
<th>σ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+B]</td>
<td>[-B]</td>
<td>[+B]</td>
</tr>
</tbody>
</table>

**Outputs:**

a. σ_1 σ_2 σ_3 | σ_1 σ_2 σ_3 |
| [+B] | [+B] | [+B] |

b. σ_1 σ_2 σ_3 | σ_1 σ_2 σ_3 |
| [+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 ALLσL and the identity constraint pertaining to that feature. For expositional convenience, IDENT-IO(V-Feature) will be used as a cover constraint.

(32) \textbf{AGREE-σXWEAK(V-F) >> IDENT-IO(V-F)}

- Ranking necessary for vowel copy harmony to obtain alternations.

\begin{tabular}{|c|c|c|}
\hline
/ce=li=mett-o/ & AGREE-σXWEAK(V-F) & IDENT-IO(V-F) \\
\hline
a. če=li=mětt-o & & * \\
b. če=li=mětt-o & & ! \\
\hline
\end{tabular}

(33) \textbf{AGREE-σXWEAK(V-F) >> ALLσL \& 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.

\begin{tabular}{|c|c|c|}
\hline
/mett-i=če=la/ & AGREE-σXWEAK(V-F) & ALLσL \& IDENT-IO(V-F) \\
\hline
a. métť-\textless{}a\textless{}=ča\textless{}=la \textless{} Regressive copy & *1, **2  \\
b. métť-\textless{}i\textless{}=či\textless{}=li \textless{} Progressive copy & **2, ***!3  \\
c. métť-e\textless{}1\textless{}=če\textless{}2\textless{}=le \textless{} Bidirectional copy & *1, ***3  \\
d. métť-i=če=la \textless{} No copy & *!*  \\
\hline
\end{tabular}

(36) \textbf{Summary (continued)}

\textbf{Directionality of copy harmony}

- Obtained via local conjunction of ALLσL and IDENT-IO(F), which cause faithfulness violations – if they occur – to optimally occur as far left as possible.
- AGREE constraint which drives harmony remains nondirectional.
- No new constraints needed.

3. Alternatives

3.1 Directionality in Previous Approaches to Vowel Harmony

\textbf{Leftward feature alignment or spreading}

(37) \textbf{ALIGN-[back]-L}

- Align the left edge of every [back] feature with the left edge of the clitic group constituent.

\begin{itemize}
  \item Will not accomplish leftward directionality here. Alignment constraints are evaluated over outputs only.
\end{itemize}

\textbf{Word-final faithfulness}

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

(39) \textbf{WF-IDENT-IO(F)}

- An output segment in the word final syllable and its input correspondent must have identical specifications for feature \( [F] \).

\begin{itemize}
  \item Does not determine which word-final syllable will control harmony.
\end{itemize}

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

(Prosodic phrasing after Nibert 1998.)

\begin{itemize}
  \item /mett-i=če=la/ 'put it (f sg) there'
  \item a. [metta][ča][la][c] b. [metti][či][li][c] c. [mété][če][le][c]
\end{itemize}
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).

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.

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 & Kissberth 1995, Myers 1997, Walker 2001b).

Edge-faithfulness for feature associations
- 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].

Output (a) below violates IDENT-IO(F)-Right but (b) obeys it:
Input: σ σ
       [-F] [+F]
Output  a. σ₁ σ₂       b. σ₁ σ₂
       [-F] [+F]

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

<table>
<thead>
<tr>
<th>a</th>
<th>a</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>σ₁</td>
<td>σ₂</td>
<td>σ₃</td>
<td>σ₄</td>
</tr>
<tr>
<td>[-F]</td>
<td>[+F]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regressive harmony

a. 0₁ • 0₂ • 0₃ • 0₄
Regressive harmony

b. 0₁ • 0₂ • 0₃ • 0₄
Bidirectional harmony

C. a₁ • a₂ • 0₃ • a₄
No harmony

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(R)-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)).

Output (a) below violates IDENT-IO(F)-Right but (b) obeys it:
Input: σ σ
       [-F] [+F]
Output  a. σ₁ σ₂       b. σ₁ σ₂
       [+F] [+F]
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: ALLcL, 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.

Acknowledgements
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References


