

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
- | | |
|--------------|---------------|
| prédok-o | ‘I preach’ |
| prédak-a | ‘he preaches’ |
| prédik-i | ‘you preach’ |
| cf. predik-á | ‘to preach’ |
- [é] → [é] by metaphonic raising
[ě] → [ě] by unstressed mid V raising
- b. Noun
- | | |
|----------|--------------|
| pěrsak-a | ‘peach tree’ |
| pěrsuk-u | ‘peach’ |
| pěrsik-i | ‘peaches’ |
- doménnak-a ‘Sunday’
doménnək-e ‘Sundays’
- [é] → [é] by metaphonic raising

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

- a. Verb
- | | |
|---------------------|-----------------------|
| mětt-á=čá=la | ‘put it (f sg)’ |
| mětt-ě=čě=le | ‘put it (f pl) there’ |
| mítt-u=čů=lu | ‘put it (m sg) there’ |
| mítt-j=čj=li | ‘put it (m pl) there’ |
| cf. /mětt-/ → mítti | ‘put’ |
| cf. čě | ‘there’ |
- [é] → [í] by metaphonic raising
- b. Noun
- | | |
|------------|---------------|
| stómnik-u | ‘stomach’ |
| stómnik-i | ‘stomachs’ |
| párd-ů=tu | ‘your father’ |
| cf. pátr-ě | ‘father’ |
| mátr-á=ta | ‘your mother’ |
| cf. mátr-ě | ‘mother’ |

(12) *Other vowel harmony in Serviglitano*

- In addition to vowel copy harmony, two other vowel harmony processes occur:
- Metaphony*: Post-tonic high vowels raise a stressed mid vowel, e.g.
/ɛ, ə/ → [e, o] and /e, o/ → [i, u].
 - 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.

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. to=lo=dík-o ‘I tell it (neut) to you (sg)’
čj=li=mětt-o ‘I put it (m pl) there’
ttů=lu=šǵn-a ‘he marks it (m pl) down for you (sg)’
cf. te ‘to you’
cf. čě ‘there’
cf. te ‘for you’
- b. mě=ssa=la=pjǵj-a ‘he takes it (f sg) from me’
tě=ččǵ=lo=dák-o ‘I give it (neut) to you (sg)’
me=ttě=ssa=la=pjǵj-a ‘he takes it (f sg) from me’
cf. se = reflexive pro.
cf. čě = reiterative pro.
- c. jje=ttunn-ímo ‘we cut it/them’
čě=fač-ímo ‘we make ourselves’
stommekós-a ‘nauseating (f sg)’
bokkal-ó ‘foolish (m sg)’
bbisuñ-ímo ‘we need’

(15) **Summary: Servigiano 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**

- (16) Descriptive terminology
- [ǝ ǝ [ǝ ǝ ó ǝ]STEM ǝ ǝ]C
- Proclitic Pretonic stem Stressed stem Post-tonic (post-tonic stem + enclitic)

(17) *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).

(18) **Prominence scale** (Italian varieties):

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

(19) **AGREE-σ_{XWEAK}(V-Feature)**

Adjacent extra weak vowels must have the same specification for V-Features. (AGREE(F) 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(20) **Perceptual**

- Unstressed vowels are perceptually weak.
- *Perceptibility is improved by extending the duration of gestures across multiple syllables.* (On certain other perceptually-motivated harmonies, see Suomi 1983, Kaun 1995; note also Flemming 1995, Steriade 1998, Majors 1998, Jiménez 1998, Walker 2003).

(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.*

2.2 Directionality(23) *Proposal*

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

(24) **Local conjunction**

Let Con1 and Con2 be constraints and D be a given domain. Then:
Con1 &_D Con2 is violated when there is some D in which both Con1 and Con2 are violated. (Smolensky 1993, 1995, 1997; see also Baković 2000, Lubowicz 2002, Itó & Mester 2003)

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 expository convenience, IDENT-IO(V-Feature) will be used as a cover constraint.

(32) **AGREE-σ_{XWEAK}(V-F) >> IDENT-IO(V-F)**

- Ranking necessary for vowel copy harmony to obtain alternations.

(33)

če=li=métt-o/	AGREE-σ _{XWEAK} (V-F)	IDENT-IO(V-F)
ESP a. čī=li=métt-o		*
b. če=li=métt-o	*!	

(34) **AGREE-σ_{XWEAK}(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.

(35)

/mett-i=če=la/	AGREE-σ _{XWEAK} (V-F)	ALLσL & IDENT-IO(V-F)
ESP a. métt-a ₁ =čā ₂ =la ₃ Regressive copy		* ₁ , ** ₂
b. métt-i ₁ =čī ₂ =li ₃ Progressive copy		** ₂ , **! ₁ , * ₃
c. métt-e ₁ =če ₂ =le ₃ Bidirectional copy		* ₁ , ***! ₃
d. métt-i=če=la No copy	*! ₁ *	

(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.

(36) **Summary (continued)**

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

Leftward feature alignment or spreading

(37) 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 ALIGN-[back]-Left:



Word-final faithfulness

- Word-final faith is argued to play a role in certain vowel harmony processes. (Hyman 1998, Krämer 2001, Walker 2003; other applications are discussed by Petrova et al. 2000, Curtin 2001. Note also Steriade 1994, Barnes 2002)

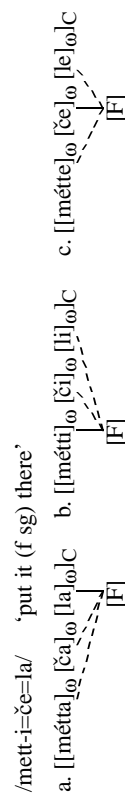
(39) **WF-IDENT-IO(F)**

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 WF-IDENT-IO(F): (Prosodic phrasing after Nibert 1998.)



(41) **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 “cyclicality” (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

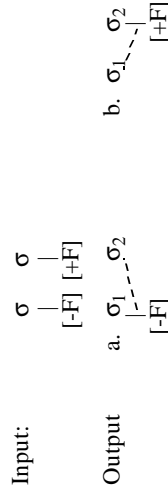
- Anchor constraints combine faithfulness with reference to edges (McCarthy & Prince 1995).
- Example: LEFT-ANCHOR-IO: The left edge of the word in the input corresponds to the left edge of the word in the output.
- Versions of ‘Anchor’ constraints, which enforce faithfulness at the edge of a feature 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:



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.

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

a • a • o • a	IDENT-IO(Rd)-R	AGREE(Rd)
a. $\sigma_1 \bullet \sigma_2 \bullet \sigma_3 \bullet \sigma_4$ Regressive harmony		*
b. $\sigma_1 \bullet \sigma_2 \bullet \sigma_3 \bullet \sigma_4$ Bidirectional harmony	*!	
c. $\sigma_1 \bullet \sigma_2 \bullet \sigma_3 \bullet \sigma_4$ No harmony		**!

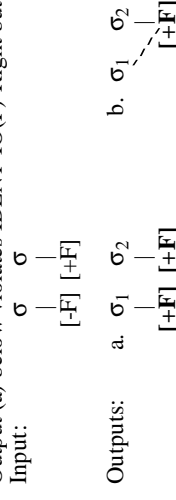
Observations:

- IDENT-IO(Rd)-R >> AGREE(Rd) obtains regressive harmony that limits satisfaction of AGREE.
- In contrast, ALL σ L & σ 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:



4. Conclusion and Further Issues

- (47) *Directionality in Servigligiano 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 Servigligiano.
 - 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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