

Long-distance Metaphony: A Generalized Licensing Proposal

Rachel Walker
University of Southern California
rwalker@usc.edu

1. Introduction

(1) Metaphony

A vowel harmony, occurring in certain Romance languages, in which a stressed vowel assimilates to a post-tonic high vowel. Most commonly involves raising. In cases under study, trigger vowel is high, word-final and suffixal.

(2) Ascrea (central Italy)

- Final high suffix vowel causes raising of preceding stressed /e, o/ to [i, u], respectively (2a). If an unstressed penult intervenes, it is unaffected (2b).

a. metʃʃi	'reap' (2 sg impf subj)	cf. metése	(1sg)
súrdu	'deaf' (m sg)	cf. sórda	(f sg)
b. túreɯ	'cloudy' (m sg) * túriɯ	cf. tóreɯa	(f sg)

(3) Unstressed [e] in (2b) is transparent despite

- /e/ raising to [i] in stressed syllables;
- [i] being a permissible unstressed vowel in the language.

(4) Preview of proposal:

a. Generalized Licensing

Metaphony is driven by a licensing constraint which requires that (perceptually) marked elements belong to a strong position. Licensing configurations include

- assimilation through local feature extension (e.g. spreading) to a strong position,
- assimilation at a distance through a correspondence relation.

b. Global Perspective

Metaphony is not an isolated phenomenon. Generalized Licensing is involved in a wide range of phonological processes, including assimilation, reduction, deletion, metathesis, and feature transfer (flop).

(5) Organization

- Metaphony patterns.
- Generalized Licensing proposal.
- Analysis: Metaphony in Romance languages of Italy and Spain.
- Cross-linguistic applications and issues; a metrical alternative.

2. Metaphony Patterns: Two Locality Behaviors

In words with antepenultimate stress, systems vary according to whether height assimilation affects an intervening penult or operates across it.

(6) Vowel phoneme inventories

a. Ascrea		b. Nalón Valley & Tudanca Montañés	
i	u	i	u
e	o	e	o
ɛ	ɔ		a
	a		

[ɛ, ɔ] restricted to stressed syllables

Tudanca (Cantabria region, northwestern Spain)

Data and description for Tudanca Montañés after Hualde (1989, 1998) (drawing on Penny 1978). (Other work on Tudanca includes McCarthy 1984, Kaze 1989, Flemming 1993, Blumenfeld to appear.)

- Tudanca shows a centralizing metaphony. Final unstressed high vowels are regularly centralized in Tudanca, analyzed as insertion of [-ATR] (Hualde 1989). Assimilation of [-ATR] centralizes stressed vowels (7a) (centralization symbolized by capitals).
- In cases of antepenultimate stress, both the stressed antepenult and intervening penult vowel are centralized (7b).

(7) a. pinta	pÍntU	'calf' (f/m)
θúrdos	θÚrdU	'left-handed' (m pl/sg)
séka	sÉkU	'dry' (f/m)
óhos	ÓhU	'eye' (pl/sg)
sekálo	sekÁlU	'to dry it (mass)/to dry him'
ahambráa	ahambrÁU	'hungry' (f/m)
b.	antigwÍsImU	'very old'
	pÓrtIkU	'hall'
	orÉgAnU	'oregano'

Ascrea (Lazio region, central Italy)

Data and description based on Fanti (1938-1940) and Maiden (1991).

- Metaphony in Ascrea raises stressed /e, o/ to [i, u] (8a), and stressed /ε, o/ to [e, o] (8b). (Raising in Ascrea is restricted to certain inflections containing high vowels.)
- | | | | | |
|-----|----|----------|----------|---------------------------------|
| (8) | a. | metésse | metí[ji] | ‘reap’ (1sg/2sg impf. subj.) |
| | | véjte | ví[jti] | ‘this’ (f pl/m pl) |
| | | sórda | súrdu | ‘deaf’ (f sg/m sg) |
| | | prefónna | prefúnnu | ‘profound’ (f sg/m sg) |
| | b. | méto | méti | ‘reap’ (1sg/2sg pres. ind.) |
| | | βélle | βélli | ‘beautiful’ (f pl/m pl) |
| | | kapóto | kapóti | ‘overturn’ (1sg/2sg pres. ind.) |
| | | óssa | óssu | ‘bone’ (sg/pl) |
- Under antepenultimate stress, a final high vowel causes raising across an unaffected nonhigh penult.
- | | | | | |
|-----|----|--------|----------|----------------------|
| (9) | a. | tóreɰa | túreɰu | ‘cloudy’ (f sg/m sg) |
| | | mórtse | mórtseru | ‘died’ (3sg/3pl) |
- b. Additional forms given by Fanti that show nonlocal raising:
- /e/ → [i] *domíneku*
 /o/ → [u] *súreku*
 /ε/ → [e] *médeku, léɰetu, étteru, stétteru*
 /o/ → [o] *sókkoli, nónnetu, kóreɰu, addórmenu*
- Metaphony does not affect /a/.
- | | | | | |
|------|--|----------|----------|-------------------------------|
| (10) | | m[á]nn-o | m[á]nn-i | ‘send (pres. ind.)’ (1sg/2sg) |
|------|--|----------|----------|-------------------------------|

Nalón Valley (Asturias region, northwestern Spain)

Data and description based on Hualde (1989, 1998). (Other work on Nalón includes Kaze 1989.)

- Like Ascrea, metaphony in the Nalón Valley variety shows raising. Stressed mid vowels become high in metaphonic contexts (11a), and stressed low vowels become [o] (11b).
- | | | | | |
|------|----|----------|---------|--------------------------------|
| (11) | a. | górdos | gúrdu | ‘fat’ (m pl/m sg) ² |
| | | kordéros | kordíru | ‘lamb’ (pl/sg) |

¹ Examples with intervening [o] are scarce in Fanti’s data. The form [sókkoli] ‘clog’ (m pl) indicates that, like [e], [o] has the capacity to be transparent. This occurs alongside [yédoa]/[yíduu] (f sg)/(m sg). The unstressed sequence [ou] might be independently dispreferred: an issue for further research.

² The m pl ending in Nalón Valley is produced as *-os ~ -us*. As Hualde (1998) points out, production of /o/ in this suffix appears to be moving towards [u], but without effect in metaphonic patterns.

- | | | | |
|----|--------------------------|--------|----------------------|
| b. | (cf. Sp. <i>gato</i>) | gótu | ‘cat’ (m sg) |
| | (cf. Sp. <i>blanco</i>) | blónku | ‘white’ (m sg count) |

- In words with antepenultimate stress, a final high vowel causes raising across an unaffected nonhigh vowel.
- | | | | |
|------|---------|--------|------------------|
| (12) | mátola | mátolu | ‘I kill her/him’ |
| | pájaros | pójaru | ‘bird’ (pl/sg) |

(13) **Locality issue***Raising of a stressed vowel across an unaffected nonhigh penult is nonlocal.*

- In recent years, several researchers have argued that featural or gestural spreading carries only between articulatorily adjacent segments (e.g., Gafos 1996, Ní Chiosáin & Padgett 1997, 2001, Walker 1998; see also Bakovic 2000, Bakovic & Wilson 2000).
 - Corresponds to understanding each instance of a feature as representing a continuous property or gesture (building on insights of Articulatory Phonology; Browman & Goldstein 1986, 1989, 1990).
 - Accomplished from a formal perspective by (the equivalent of) a constraint on gapped configurations in *Gen*. (For perspectives on NOGAP’s universal illformedness, see the aforementioned work on locality, also Archangeli & Pulleyblank 1994, 2002, Pulleyblank 1996. Ní Chiosáin & Padgett 2001 characterize locality in terms of “convexity.”³)
- (14) NOGAP:

* α β γ Where α, β, and γ are segments

$$\begin{array}{c} \alpha \quad \beta \quad \gamma \\ \diagdown \quad \diagup \\ [F] \end{array}$$

(15) **Perceptual transparency**

- It has been proposed that certain so-called ‘transparent’ segments actually undergo assimilation, but without perceptible consequences. (In addition to research cited above, see, e.g., Flemming 1995, Walker & Pullum 1999; also experimental studies by Gafos & Benus 2003, Gick et al 2005, Walker et al. in preparation.)
- Imperceptibility explanation is not available for Ascrea & Nalón Valley.** Nonhigh vowel raising is perceptible elsewhere in the system. Moreover, even in unstressed positions (most) expected raised qualities are attested and perceptible.

³ Departing views on locality and/or the interpretation of distance linking are discussed by Calabrese (1995), van der Hulst & van de Weijer (1995), Halle, Vaux & Wolfe (2000), Mailhot & Reiss (2004), and Uffmann (2004), among others.

(16) **Summary**

- Metaphony patterns under study involve assimilation of a stressed vowel to final unstressed (Tudanca: centralizing; Ascrea & Nalón Valley: raising).
- In words with antepenultimate stress, systems vary according to whether height assimilation affects an intervening, unstressed penult:
 - Tudanca – metaphony affects an intervening mid vowel;
 - Ascrea and Nalón Valley – metaphony does not affect an intervening nonhigh vowel, but operates across it.
- Transparency in Ascrea and Nalón presents a locality problem.

3. Licensing of Marked Structure(17) **Proposal Overview**

- **Licensing constraint drives metaphony**
High, unstressed vowels are a perceptually-marked structure (i.e. have relatively poor perceptibility). Their height features must be licensed by (also) being expressed in a prosodically-strong position.
- **Licensing-at-a-distance is achieved by correspondence**
Various configurations achieve licensing. Licensing across an intervening syllable is accomplished by correspondence between trigger and target, producing assimilation.

(18) *Positional Markedness* Licensing effects – Features

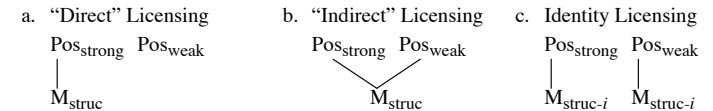
Steriade (1995), Zoll (1996, 1997), Majors (1998), Crosswhite (1999), Walker (2001a, 2005), Revithiadou et al. (2005)⁴

- Assimilation of weak position to strong position.
- Assimilation of strong position to weak position.
- Attraction of floating features to strong position.
- Migration of features from weak position to strong position.
- Loss of marked structure in weak position.

Licensing: Functional basis

Marked structure (i.e. complex, perceptually weak, articulatorily difficult, etc.) must find some expression in a strong position (Walker 2005).

⁴ Other applications and extensions of the positional markedness mode of licensing (Zoll 1996) include Ringen & Vago (1998), Balassa (2000), Alber (2001), among others; also note Goldsmith (1990).

(19) **Goal:** Unite three licensing configurations (“Direct”/“Indirect” after Steriade 1995)(20) **Chain**

Let X be an element belonging to a given representation R. Then X’s chain is composed of X and all its correspondent elements within R.

(21) **Generalized Licensing:** LICENSE $\text{M}_{\text{struc}}/\text{Pos}_{\text{strong}}$

- Let
- M_{struc} be a given type of marked structure,
 - $\text{Pos}_{\text{strong}}$ be a given type of strong position,
 - and R be a phonological representation.

Then for any instance of M_{struc} in R, some member of its chain belongs to $\text{Pos}_{\text{strong}}$ in R.

Extends formulations by Zoll (1996), Crosswhite (1999), and Walker (2005); note also Steriade (1995). On the basis for linguistic positional privilege, see the aforementioned and Beckman (1997, 1998), Alber (2001), and Smith (2002), among others.⁵

(22) **Licensing obeyed by three configurations** (plus deletion)

- Correspondence, feature extension, etc. not stipulated in licensing constraint.
- Particular means by which licensing is satisfied in a given language is determined by constraint ranking.

Precursors using correspondence for assimilation at a distance include Krämer 2001 (for V harmony), Walker (2000ab), Hansson (2001, 2006), Rose & Walker (2004), McCarthy (to appear) (for C harmony), and Rose (2004) (for long-distance C-V agreement), among others.

(23) **Perceptual markedness:** Detailing M_{struc} applicable to features

- Let f be an occurrence of feature [F] in a representation R.
- Then f may be characterized as perceptually marked according to one or more of the following restrictions:
 - f is a specification that is perceptually difficult.
 - f belongs to a prosodically weak position.
 - f occurs in a perceptually difficult feature combination.

⁵ See Blumenfeld (to appear) for discussion of the “too-many-solutions” problem in relation to an OT analysis of Tudanca metaphony and a proposal in terms of implicational constraints.

- (24) Metaphonic triggers are perceptually disadvantaged
- High vowels – lower amplitude, shorter duration.
 - Unstressed vowels – reduced amplitude and duration, lack salient pitch contour.

(25) Licensing constraint that drives metaphony:
LICENSE (Height)-in-V_[+high]/ó Henceforth **LICENSE(Height)/ó**
 For any instance of [high], [low], [ATR] in a high vowel in a word, some member of that feature's chain belongs to a stressed syllable.

- For expositional convenience, (25) is used a cover constraint for individual licensing constraints pertaining to [high], [low], [ATR].
- In interests of uniformity across Romance, licensing constraints for all height Fs are assumed to be ranked at same place in a given hierarchy, but this is not crucial.
- In metaphony patterns under study, licensing is posited to be further restricted to word-final suffix Vs, as (sole) carriers of a morphological distinction (e.g. m sg) (after Majors 1998, see also Maiden 1991 on morphological conditioning in phonological metaphonic patterns of Italy; cf. Dillon 2004).

4. Analysis: Local vs. Nonlocal Metaphony in Central Veneto and Ascrea

4.1 Local vs. non-local metaphony

Ascrea – Recall principal facts:

- High vowel suffix raises stressed /e, o/ to [i, u] (26a) and stressed /ε, o/ to [e, o] (26b). Under antepenultimate stress, raising occurs across an unaffected nonhigh penult (26c).

(26) a.	metésse	met[ɛ]i	'reap' (1sg/2sg impf. subj.)
	prefónna	prefúnnu	'profound' (f sg/m sg)
b.	méto	méti	'reap' (1sg/2sg pres. ind.)
	kapóto	kapóti	'overturn' (1sg/2sg pres. ind.)
c.	tóreya	túreyu	'cloudy' (f sg/m sg)
	mórtse	mórtseru	'died' (3sg/3pl)

Key rankings

- Metaphony causes raising of /e o ε o/ in a stressed syllable. Hence the licensing constraint dominates IDENT-IO constraints for [high] and [ATR] (IDENT-[F] formulated after McCarthy & Prince 1995; [e o] assumed to be mid [-ATR] vowels, after Calabrese 1988).

- (27) Metaphony: LICENSE(Height)/ó >> IDENT-IO(high)⁶
 For demonstration purposes, only the [high] height feature is shown here.

/prefonnu/	LICENSE(Height)/ó	IDENT-IO(high)
a. prefúnnu [+high]		*
b. prefónnu [+high]	*!	
c. prifúnnu [+high]		**!

On sub-optimality of a candidate which lowers the unstressed vowel (e.g. /prefonnu/ → *[prefónno]), see Walker (2005).

- Under antepenultimate stress, metaphony leaves an intervening nonhigh penult vowel unaffected. This results from an identity licensing configuration. Therefore, IDENT-IO(high) dominates INTEGRITY, which prohibits multiple correspondence.

- (28) **INTEGRITY-IO** (McCarthy & Prince 1995)
 No element of the input has multiple correspondents in the output.

Featural licensing by correspondence involves correspondence at featural level
 On correspondence between features, see Lamontagne & Rice (1995), McCarthy & Prince (1995), Causley (1996), Zoll (1996), Ringen & Vago (1998), Lombardi (2001), Walker (2001a).

- (29) Multiple correspondence under long-distance licensing

<i>Input</i>	/toɾeyu/	<i>Output</i>	[túreyu]
	[-hi] ₁ [+hi] ₂		[+hi] ₂ [+hi] ₂

- (30) Transparent penult: IDENT-IO(high) >> INTEGRITY-IO

/toɾeyu/	LICENSE(Height)/ó	IDENT-IO(high)	INTEGRITY-IO
 [-hi] ₁ [+hi] ₂			
a. túreyu [+hi] ₂ [+hi] ₂		*	*
b. túriyu [+hi] ₂		**!	

⁶ For simplicity, the representations here show linkage between vowels, but there is reason to believe that propagated features in vowel harmony carry through consonants as well. See Ní Chiosáin & Padgett (2001).

- In adjacent syllables, indirect licensing is favored over identity licensing, because it minimizes violations of INTEGRITY.

(31) Indirect licensing favored in adjacent syllables.

/prefonnu/	LICENSE(height)/ó	IDENT-IO(high)	INTEGRITY-IO
a. prefúnnu [+hi] ₂		*	
b. prefúnnu [+hi] ₂ [+hi] ₂		*	*!

(32) **Results**

- Correspondence is recruited as a means of satisfying licensing while minimizing violations of IDENT – produces *Identity Licensing* configuration.
- When trigger and target are in adjacent syllables, *Indirect Licensing* configuration is preferred to minimize INTEGRITY violations.

- Analysis of Nalón Valley metaphony is similar in essentials to that of Ascrea.
- Stepwise raising addressed in §4.2.

Recall principal facts for metaphony in Tudanca:

- A final unstressed high vowel, which is regularly centralized, causes centralization of stressed vowels (33a). Under antepenultimate stress, centralizing metaphony affects both the stressed antepenult and intervening penult vowel (33b).

(33) a.	óhos	ÓhU	‘eye (m pl/sg)’
	sekálo	sekÁIU	‘to dry it (mass)/to dry him’
b.	antigwísImU	orÉgAnU	‘very old’ ‘oregano’

Key rankings

- LICENSE(height)/ó dominates IDENT-IO(ATR) to produce centralizing alternations.
- Under antepenultimate stress, an intervening penult vowel also undergoes metaphony. Hence INTEGRITY dominates IDENT-IO(ATR) to prevent distance licensing.

(Tableau in (34) assumes insertion of [-ATR] on final vowel (after Hualde 1989). This is enforced by a constraint which is not of focal interest for present purposes.)

(34) Affected penult: LICENSE(height)/ó, INTEGRITY-IO >> IDENT-IO(ATR)

/oreganu/	LICENSE(height)/ó	INTEGRITY-IO	IDENT-IO(ATR)
a. orÉgAnU [-ATR] ₂			***
b. orÉganU [-ATR] ₂ [-ATR] ₂		*!	**

(35) **Summary**

- Metaphony in Ascrea, Nalón Valley, and Tudanca is driven by a licensing requirement for height features in perceptually marked vowels.
- Representations are available that accomplish assimilation by feature extension and by correspondence. Rankings determine outcome for the language in question.

Ascrea – transparent unstressed penult

LICENSE(height)/ó >> IDENT-IO(high)/(ATR) >> INTEGRITY-IO

Tudanca – affected unstressed penult

LICENSE(height)/ó, INTEGRITY-IO >> IDENT-IO(ATR)

4.2 Gradual vowel raising

(36) **Ascrea stepwise raising**

Accomplished by local conjunction of IDENT constraints for [high] and [ATR] (after Kirchner 1996; on constraint conjunction, see Smolensky 1993).

(37) **IDENT-IO(high) &_{seg} IDENT-IO(ATR)**

If a segment violates IDENT(high), it does not violate IDENT(ATR), and vice versa.

(38) IDENT(high) &_{seg} IDENT(ATR) >> LICENSE(height)/ó >> IDENT-IO(high)/(ATR)

/mɛti/	IDENT(high)& _{seg} IDENT(ATR)	LICENSE(height)/ó	IDENT-IO(high)/ (ATR)
a. mɛ́ti		*	*
b. mɛ̀ti		**!	
c. míti	*!		**

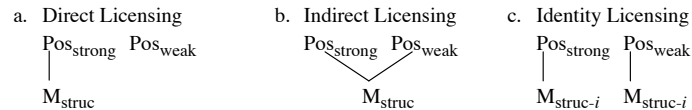
- Low vowels are not affected in Ascrea metaphony because of a high-ranking identity constraint for [low] i.e., as a consequence of the ranking: IDENT-IO(low) >> LICENSE(height)/ó.

(39) Nalón Valley metaphony

- /a/ → [ɔ]: Attributable to effect of contrast preservation – avoids merger of /a/ with an existing mid vowel under raising (see Lubowicz 2003 for a formal approach to contrast preservation).

5. Cross-linguistic applications and issues

5.1 Applications of Generalized Licensing across languages

(40) *Recall*: Three licensing configurations(41) Indirect Licensing

Ranking schema: **LICENSE M_{struc}/Pos_{strong}, INTEGRITY-IO >> IDENT-IO(F)**

- Exx:
- *Tudanca Montañés* – [-ATR] licensed by ó; alternations in ǒ.
 - *Aimara (Jaqaru dialect)* – All features of final unstressed vowels licensed by a stressed vowel; alternations in ǒ (Cerrón-Palomino Lopez 2003).
 - *Koya* – Features of short, unstressed high Vs and /a/ (often realized as [ə]) licensed by long, stressed vowels; alternations in ǒ (Majors 1998).
 - *Classical Mongolian* – [Round] in nonhigh Vs licensed by initial syllable (Walker 2001b).
 - *Japanese* – [C-Place] licensed by syllable onset (Itô 1986, Steriade 1995).
 - *Russian* – [Voice] in obstruents licensed by onset (Lombardi 1991, Steriade 1995).

(42) Identity Licensing

Ranking schema: **LICENSE M_{struc}/Pos_{strong} >> IDENT-IO(F) >> INTEGRITY-IO**

- Exx:
- *Ascrea* – [+high], [+ATR] (in a high V) licensed by ó.
 - *Lena, Nalón Valley* – [+high], [-low] (in a high V) licensed by ó (Hualde 1989, 1998).
- Identity licensing could also arise under **LICENSE M_{struc}/Pos_{strong} >> *M >> INTEGRITY**, where *M blocks an intervening vowel from undergoing assimilation.

(43) Direct Licensing

Ranking schema:

LICENSE M_{struc}/Pos_{strong}, CRISP-EDGE(σ, F), (INTEGRITY-IO) >> IDENT-IO(F)

CRISP-EDGE(σ, F) requires that a chain for F be wholly contained within a given syllable.

(For formal definitions of CRISPEDGE constraints, see Itô & Mester 1999, Walker 2001b, Kawahara to appear.)

- Exx:
- *Italian* – [-ATR] mid Vs licensed by ó; alternations in ǒ (Crosswhite 2004).
 - *Esimbi* – Vowel height features licensed by initial syllable; migrate from root to prefix (Walker 2001a).
 - *Ligurian* – Final unstressed [i] undergoes metathesis with a stem-final C to form a diphthong in the licensing ó (Fomer 1975).
 - *Luiseño* – neutralization of a mid/high vowel contrast in unstressed syllables via raising (Crosswhite 1999).
 - *Arabic dialects* – High unstressed vowels undergo deletion (in certain circumstances) (e.g. Brame 1974, Hayes 1995).
 - *Ola Lamut* – [Round] in a nonhigh V licensed by initial syllable (Walker 2001b).
 - *Western Popoluca* – [C-Place] licensed by syllable onset (Steriade 1995).
 - *German* – [Voice] in obstruents licensed by onset (Lombardi 1991, Steriade 1995).
 - *Japanese* – Cs with complex Place (secondary articulation) formed in mimetic palatalization licensed by initial syllable (Zoll 1996, 1997).

(44) Summary

The constraints and structures involved in metaphony are also involved in many other phonological processes and patterns in diverse languages.

5.2 Proximity in Licensing

Selecting the closest licenser

Scale restricting proximity of corresponding segments:

On proximity applied to correspondence, see Rose (2004), Rose & Walker (2004). Other work on conditions restricting proximity of interacting segments includes Odden (1994), Suzuki (1998), Rose (2000), Pulleyblank (2002), Uffmann (2004). Cf. Mailhot & Reiss (2004) on *closest* relations in a constraint-free approach to vowel harmony.

- (45) PROXIMITY-X - Correspondent elements are separated by no more than X.
- (46) PROXIMITY-Seg >> PROXIMITY-μ >> PROXIMITY-μμ >> PROXIMITY-σσ >> ... >> PROXIMITY-∞

- Particular units relevant for PROXIMITY-X scale remain to be determined.
- PROXIMITY-X constraints must be dominated to produce long-distance Identity Licensing; however, they will favor the closest licenser.

(47) Closest licenser: LICENSE(F)/σ >> PROX-Seg >> ... PROX-μμ >> ... PROX-∞

/σσσσσ/	LICENSE(F)/σ	PROXIMITY-Seg	PROXIMITY-μμ	PROXIMITY-∞
 [F]				
≅ a. σσσσσ [F] [F]		*		
b. σσσσσ [F] [F]		*	*!	
c. σσσσσ [F]	*!			

6. A Metrical Alternative

(48) **Metrical approach** to metaphony: (Hualde 1989)

(For related work, see also Zubizarreta 1979, Halle & Vergnaud 1981, Poser 1982, van der Hulst & Smith 1982, Piggott 1996.)

- Feature assimilation takes place through metrical structure (rule parameter).
- Assimilating feature percolates through the metrical structure constructed for assignment of stress.
- Antepenultimate stress: Extrametrical final σ is adjoined to preceding foot.
- Participation of unstressed penult determined by target parameter – Head or V.

(49) Two metrical-based rules (by extension from Hualde 1989)

- | | |
|---|--|
| a. <i>Tudanca</i>
Operation: spread
Mode: metrical
Domain: stress foot
Argument: [-ATR] | b. <i>Ascrea</i>
Operation: spread
Mode: metrical
Domain: stress foot
Argument: [+high], Trigger: __## |
|---|--|

Target: V	Target: head
-----------	---------------------

(50) Resulting representations:

- | | |
|---|--|
| a. <i>Tudanca</i>
orÉgAnU
↓
[-ATR] | b. <i>Ascrea</i>
túreʉu
↓
[+high] |
|---|--|

(51) Issues in comparison to Generalized Licensing approach

a. Motivation

Metrical Approach misses Generalized Licensing’s explanation that metaphony expresses otherwise perceptually weak elements in Pos_{strong}. Also, the perceptual weakness is not just prosodic in nature (unstressed), but also featural (high Vs).

b. Cross-linguistic conspiracies

Generalized Licensing unites phenomena targeting M_{struc} that lacks association to Pos_{strong}. It accommodates repairs along lines of direct, indirect, and identity licensing, plus deletion/feature change, resulting in broad empirical coverage. Metrical rules address assimilation phenomena in particular.

c. Formal representations

Generalized Licensing maintains notion that each feature specification is a continuous element, achieving a closer connection between formal representations and gestural models of language production. Gapped configuration in (50b) lacks this connection.

d. Locality

Both approaches predict potential for nonlocal interactions.

In Metrical Approach, these are restricted to domain of the foot together with any appended syllables.

In Generalized Licensing Approach, interactions at any distance in a word are predicted possible (in some language), provided that closest licenser is selected.

Further research on phenomena bearing on locality question is needed.

7. Conclusion

(52) Metaphony: Theoretical issues addressed here

- Reveals nonlocal assimilations across vowels whose transparency cannot be attributed to lack of perceptible participation.

- Shows a positional markedness licensing distribution, wherein perceptually marked structure requires licensing by association to a strong position.
- (53) Generalized Licensing approach
- Incorporates notion of chains in phonological representations and licensing.
 - Accommodates three licensing configurations: direct, indirect, and identity licensing, plus deletion, feature change/reduction.
 - Long-distance identity licensing configuration and adjacent indirect licensing can occur together in same licensing pattern.
 - The choice of licensing configuration is an epiphenomenon of constraint ranking.
- Finds a common basis among a variety of processes that circumvent perceptually-difficult contrasts, either by augmenting the perceptually-weak structure or eliminating it. *The significance stems from the result not the process itself.*

Further Research

- Explore extensions to transparency in more familiar vowel harmonies, such as Ural-Altaic patterns, in which harmony is initiated by an word-initial vowel.

References

- Alber, Birgit. 2001. Maximizing first positions. In Caroline Féry, Antony Dubach Green & Ruben van de Vijver, eds., *Proceedings of HILP 5. Linguistics in Potsdam*, Vol. 12, pp. 1-19. University of Potsdam.
- Archangeli, Diana & Douglas Pulleyblank. 1994. *Grounded Phonology*. Cambridge: MIT Press.
- Archangeli, Diana & Douglas Pulleyblank. 2002. Kinande vowel harmony: domains, grounded conditions and one-sided alignment. *Phonology* 19, 139-188.
- Bakovic, Eric. 2000. *Harmony, Dominance and Control*. PhD dissertation, Rutgers University.
- Baković, Eric & Colin Wilson. 2000. Transparency, strict locality and targeted constraints. *WCCFL* 19, 43-56.
- Balassa, Judit. 2000. Positional faithfulness and positional markedness in Shuluun Höh rounding harmony. Paper presented at MCWOP, Ohio State University, October 2000.
- Beckman, Jill. 1997. Positional faithfulness, positional neutralization and Shona vowel harmony. *Phonology* 14, 1-46.
- Beckman, Jill. 1998. *Positional Faithfulness*. PhD dissertation, University of Massachusetts, Amherst. [Published by Garland, New York, 1999.]
- Blumenfeld, Lev. To appear. Too many solutions: prosody and its segmental effect. *CLS* 41.
- Brame, Michael. 1974. The cycle in phonology: Stress in Palestinian Arabic, Maltese, and Spanish. *Linguistic Inquiry* 5, 39-60.
- Browman, Catherine & Louis Goldstein. 1986. Towards an articulatory phonology. *Phonology Yearbook* 3, 219-52.
- Browman, Catherine & Louis Goldstein. 1989. Articulatory gestures as phonological units. *Phonology* 6, 201-51.
- Browman, Catherine & Louis Goldstein. 1990. Tiers in articulatory phonology, with some implications for casual speech. In John Kingston & Mary Beckman, eds., *Papers in*

- Laboratory Phonology I: Between the Grammar and Physics of Speech*, pp. 341-76. Cambridge: Cambridge University Press.
- Calabrese, Andrea. 1988. *Towards a Theory of Phonological Alphabets*. PhD dissertation, MIT.
- Calabrese, Andrea. 1995. A constraint-based theory of phonological markedness and simplification procedures. *Linguistic Inquiry* 26, 373-463.
- Causley, Trisha. 1996. Featural correspondence and identity: The Athapaskan case. *NELS* 27.
- Cerrón-Palomino López, Alvaro. 2003. A case of weak triggers: Vowel harmony in Jaqaru, ms., University of Southern California.
- Crosswhite, Katherine. 1999. *Vowel Reduction in Optimality Theory*. PhD dissertation, UCLA. [Published by Routledge, New York, 2001.]
- Crosswhite, Katherine. 2004. Vowel reduction. In Bruce Hayes, Robert Kirchner & Donca Steriade, eds., *Phonetically-Based Phonology*, pp. 191-231. Cambridge: Cambridge University Press.
- Dillon, Caitlin. 2004. Metaphony as morpheme realization, not vowel harmony. IULC Working Papers Online, Vol. 4.
- Fanti, Renata. 1938; 1939; 1940. Note fonetiche e morfologiche sul dialetto di Ascrea (Rieti). *L'Italia dialettale* 14, 201-218; 15, 101-135; 16, 77-140.
- Flemming, Edward. 1993. *The Role of Metrical Structure in Segmental Rules*. Masters thesis, UCLA.
- Flemming, Edward. 1995. Vowels undergo consonant harmony. Paper presented at the Trilateral Phonology Weekend 5, University of California, Berkeley.
- Forner, Werner. 1975. *Generative Phonologie des Dialekts von Genua*. Hamburg: Buske.
- Gafos, Adamantios. 1996. *The Articulatory Basis of Locality in Phonology*. PhD dissertation, Johns Hopkins University. [Published by Garland, New York, 1999.]
- Gafos, Adamantios & Stefan Benus. 2003. On neutral vowels in Hungarian. In D. Recasens, J.-M. Sole & J. Romero, eds., *Proceedings from 15th ICPhS*. Universitat Autònoma de Barcelona.
- Gick, Bryan, Douglas Pulleyblank, Ngessimo Mutaka & Fiona Campbell. 2005. Low vowels and transparency in Kinande vowel harmony. Poster presented at the meeting of the Acoustical Society of America, May 2005, Vancouver, B.C.
- Goldsmith, John A. 1990. *Autosegmental and Metrical Phonology*. Oxford: Blackwell.
- Halle, Morris, Bert Vaux & Andrew Wolfe. 2000. On feature spreading and the representation of place of articulation. *Linguistic Inquiry* 31, 387-444.
- Halle, Morris & Jean-Roger Vergnaud. 1981. Harmony processes. In W. Klein & W. Levelt, eds., *Crossing the Boundaries in Linguistics*, pp. 1-22. Dordrecht: Foris.
- Hansson, Gunnar. 2001. *Theoretical & Typological Issues in Consonant Harmony*. PhD dissertation, University of California, Berkeley.
- Hansson, Gunnar Ólafur. 2006. Understanding harmony as agreement. Paper presented at the annual meeting of the Linguistic Society of America, Albuquerque, NM, January 5-8, 2006.
- Hayes, Bruce. 1995. *Metrical Stress Theory*. Chicago: The University of Chicago Press.
- Hualde, José I. 1989. Autosegmental and metrical spreading in the vowel-harmony systems of northwestern Spain. *Linguistics* 27, 773-805.
- Hualde, José I. 1998. Asturian and Cantabrian metaphony. *Rivista di Linguistica* 10, 99-108.
- Hulst, Harry van der & Norval Smith. 1982. Prosodic domains and opaque segments in autosegmental theory. In Harry van der Hulst & Norval Smith, eds., *The Structure of Phonological Representations*, Part II, pp. 311-336. Dordrecht: Foris.
- Itô, Junko. 1986. *Syllable Theory in Prosodic Phonology*. PhD dissertation, University of Massachusetts, Amherst. [Published by Garland, New York, 1988.]
- Itô, Junko & Armin Mester. 1999. Realignment. In René Kager, Harry van der Hulst, & Wim Zonneveld, eds., *The Prosody-Morphology Interface*, pp. 188-217. Cambridge: Cambridge University Press.
- Kawahara, Shigeto. To appear. On the proper treatment of non-crisp edges. *Japanese/Korean Linguistics* 13. CSLI.

- Kaze, Jeffery. 1989. *Metaphony in Spanish and Italian Dialects Revisited*. PhD dissertation, University of Illinois, Urbana-Champaign.
- Kirchner, Robert. 1996. Synchronic chain shifts in Optimality Theory. *Linguistic Inquiry* 27, 341-349.
- Krämer, Martin. 2001. *Vowel Harmony & Correspondence Theory*. PhD dissertation, Heinrich-Heine-Universität.
- Lamontagne, Greg & Keren Rice. 1995. A correspondence account of coalescence. In Jill Beckman, Laura Walsh-Dickey, & Suzanne Urbanczyk, eds., *University of Massachusetts Occasional Papers: Papers in Optimality Theory* 18, pp. 211-223. Amherst, MA: GLSA.
- Lombardi, Linda. 1991. *Laryngeal Features and Laryngeal Neutralization*. PhD dissertation, University of Massachusetts, Amherst. [Published, New York: Garland, 1994.]
- Lombardi, Linda. 2001. Why Place and Voice are different: Constraint-specific alternations in Optimality Theory. In Linda Lombardi, ed., *Segmental Phonology in Optimality Theory*, pp. 13-45. Cambridge University Press.
- Lubowicz, Anna. 2003. *Contrast Preservation in Phonological Mappings*. PhD dissertation, University of Massachusetts, Amherst.
- Maiden, Martin. 1991. *Interactive Morphology: Metaphony in Italy*. New York: Routledge.
- Mailhot, Fred & Charles Reiss. 2004. What is a possible phonological rule? Ms., Concordia University.
- Majors, Tivoli. 1998. *Stress-dependent Harmony*. PhD dissertation, University of Texas, Austin.
- McCarthy, John. 1984. Theoretical consequences of Montañés vowel harmony. *Linguistic Inquiry* 15, 291-318.
- McCarthy, John. To appear. Consonant harmony via correspondence: Evidence from Chumash. In L. Bateman & A. Werle, eds., *Papers in Optimality Theory* 3. Amherst, MA: GLSA.
- McCarthy, John & Alan Prince. 1995. Faithfulness and reduplicative identity. In Jill Beckman, Laura Walsh-Dickey, & Suzanne Urbanczyk, eds., *University of Massachusetts Occasional Papers: Papers in Optimality Theory* 18, 249-384. Amherst, MA: GLSA.
- Ni Chiosáin, Máire & Jaye Padgett. 1997. Markedness, segment realization, and locality in spreading. Report no. LRC-97-01. Linguistics Research Center, UC Santa Cruz.
- Ni Chiosáin, Máire & Jaye Padgett. 2001. Markedness, segment realization and locality in spreading. In Linda Lombardi, ed., *Segmental Phonology in Optimality Theory*, pp. 118-156. Cambridge University Press.
- Odden, David. 1994. Adjacency parameters in phonology. *Language* 70, 289-330.
- Penny, Ralph. 1978. *Estudio estructural del habla de Tudanca*. Beihefte der Zeitschrift für romanische Philologie 167. Tübingen: Niemeyer.
- Piggott, Glyne L. 1996. Implications of consonant nasalization for a theory of harmony. *Canadian Journal of Linguistics* 41, 141-174.
- Poser, William. 1982. Phonological representations and action-at-a-distance. In Harry van der Hulst and Norval Smith, eds., *The Structure of Phonological Representations*, Part II, pp. 121-158. Dordrecht: Foris.
- Pulleyblank, Douglas. 1996. Neutral vowels in Optimality Theory: A comparison of Yoruba and Wolof. *Canadian Journal of Linguistics* 41, 295-347.
- Pulleyblank, Douglas. 2002. Harmony drivers: No disagreement allowed. *BLS* 28, 249-267.
- Revithiadou, Anthi, Marc van Oostendorp, Kalomira Nikolou & Maria-Anna Tiliopoulou. 2005. Vowel harmony in contact-induced systems: the case of Asia Minor dialects of Greek. Ms., University of the Aegean and Meertens Institute. [ROA 731.]
- Ringen, Catherine O. & Robert M. Vago. 1998. Hungarian vowel harmony in Optimality Theory. *Phonology*, 15, 393-416.
- Rose, Sharon. 2000. Rethinking geminates, long-distance geminates and the OCP. *Linguistic Inquiry* 31, 85-122.
- Rose, Sharon. 2004. Long-distance vowel-consonant agreement in Harari. *Journal of African Languages and Linguistics* 25, 41-87.
- Rose, Sharon & Rachel Walker. 2004. A typology of consonant agreement as correspondence. *Language* 80, 275-531.
- Smith, Jennifer. 2002. *Phonological Augmentation in Prominent Positions*. PhD dissertation, University of Massachusetts, Amherst.
- Smolensky, Paul. 1993. Harmony, markedness, and phonological activity. Paper presented at the First Rutgers Optimality Workshop (ROW 1), Rutgers University, New Brunswick, New Jersey.
- Steriade, Donca. 1995. Underspecification and markedness. In John Goldsmith, ed., *The Handbook of Phonological Theory*, pp. 114-174. Oxford: Blackwell.
- Suzuki, Keiichiro. 1998. *A Typological Investigation of Dissimilation*. PhD dissertation, University of Arizona.
- Uffmann, Christian. 2004. *Vowel Epenthesis in Loanword Phonology*. PhD dissertation, University of Marburg.
- Walker, Rachel. 1998. *Nasalization, Neutral Segments, and Opacity Effects*. PhD dissertation, University of California, Santa Cruz. [Published by Garland, New York, 2000.]
- Walker, Rachel. 2000a. Long-distance consonantal identity effects. *WCFL* 19, 532-545.
- Walker, Rachel. 2000b. Yaka nasal harmony: Spreading or segmental correspondence? *BLS* 26, 321-332.
- Walker, Rachel. 2001a. Positional markedness in vowel harmony. In Caroline Féry, Antony Dubach Green & Ruben van de Vijver, eds., *Proceedings of HILP 5. Linguistics in Potsdam*, Vol. 12, pp. 212-232. University of Potsdam.
- Walker, Rachel. 2001b. Round licensing, harmony, and bisyllabic triggers in Altaic. *Natural Language and Linguistic Theory* 19, 827-878.
- Walker, Rachel. 2005. Weak triggers in vowel harmony. *Natural Language and Linguistic Theory* 23, 917-989.
- Walker, Rachel, Dani Byrd & Fidèle Mpiranya. In preparation. An articulatory examination of consonants in Kinyarwanda's sibilant harmony. Ms., University of Southern California and CNRS Sorbonne Nouvelle/University of Chicago.
- Walker, Rachel & Geoffrey K. Pullum. 1999. Possible and impossible segments. *Language* 75, 764-780.
- Zoll, Cheryl. 1996. *Parsing Below the Segment in a Constraint-Based Framework*. PhD dissertation, University of California, Berkeley. [Published by CSLI, Stanford, 1998.]
- Zoll, Cheryl. 1997. Conflicting directionality. *Phonology* 14, 263-286.
- Zubizarreta, Maria Luisa. 1979. Vowel harmony in Andalusian Spanish. In Ken Safir, ed., *MIT Working Papers in Linguistics* 1, 1-11.