

Vowel harmony in Romance varieties: representing minimal contrast

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1. Introduction. Recently, the significance of contrast in phonology has received much renewed attention (e.g. Dresher & Zhang (2004), Flemming 1995, Lubowicz 2003, Padgett 1997). The present study advances this line of research by focusing on the role of *minimal contrast*. Minimally contrastive segments are pairs of segments that differ just along one dimension of contrast (Jakobson et al. 1952). Here, I present evidence for the importance of minimal contrast from vowel harmony patterns in the Romance dialects of Lena (Northwestern Spain) and Calvello (Southern Italy) (Dyck 1995). In these varieties, the presence of minimal height contrasts determines the application of vowel height harmony. In view of these facts, a new system to encode minimal contrast is proposed and framed within Optimality Theory (OT). Finally, an analysis of Lena harmony is developed incorporating the new representation of minimal contrast.

2. Vowel height harmony in Lena and Calvello. Evidence for the relevance of minimal contrast comes from vowel height harmony in Lena and Calvello. In these Romance varieties, post-tonic high vowels trigger raising of a stressed vowel. Interestingly, this harmony is triggered only by high vowels that minimally contrast for height. In Lena, only back vowels contrast for height, and the high back vowel is the only trigger. In Calvello, a height contrast exists only for front vowels, and harmony is triggered by the front high vowel. These patterns illustrate a phonological process sensitive to minimal contrast. Focusing on Lena, examples of the height harmony are shown in (1), where a high vowel causes raising of a preceding tonic one. In Lena, the trigger is always a word-final inflectional suffix. The inflectional inventory and its realization are given in (2, 3). This inflectional system is asymmetrical—only back vowels contrast for height. Production of the front vowel ranges from [i] to [e] but it lacks a height contrast. Relevant here is that, even when a front vowel is realized as a high vowel specified as [+high], it never triggers harmony, as seen in (4). The generalization is that only a high vowel that minimally contrasts for height can trigger the harmony.

3. Proposal: representation of minimal contrast. The facts from Lena (and Calvello) show that the application of height harmony depends on whether the trigger is minimally contrastive for height. Therefore, I argue that the phonological representation must include information about minimal contrast, which can be active or relevant for different phonological processes. I formalize this contrast with a *contrast-coindexing* mechanism, which applies to minimally contrastive segments that are able to distinguish pairs of words. Minimal contrast is assessed at the word level, taking the language's entire set of words into consideration (Flemming 1995). Framed within OT, the *contrast-coindexing* function is argued to apply after GEN generates the candidates and before EVAL operates over them.

How does *contrast-coindexing* work? *Contrast-coindexing* compares any two candidate words and establishes whether they form a minimal pair. If so, the differing segments are evaluated for their dimensions of contrast. If they share all dimensions except for one, then they are *contrast-coindexed* for this dimension. Example (5) shows the *contrast-coindexing* representation for Lena vowel height and backness, through hypothetical inflectional suffixes. Front vowels do not minimally contrast for height, as they do not differ from some other element only in height. Thus, they lack a *contrast-coindex* for this dimension.

4. Analysis of Lena. Walker (2005) argues that vowel height harmony takes place in order to improve perceptibility of a height feature in a perceptually weak position (cf. Revithiadou et al. 2005). I extend this approach to Lena by incorporating the *contrast-coindexing* proposal. Walker presents a schema for positional licensing constraints, which requires features in

perceptually weak positions, e.g. an inflectional suffix, to be associated with a strong position, e.g. a stressed syllable. The observation that Lena harmony singles out [+high] when it is *contrast-coindexed* for height is incorporated in the licensing constraint in (6). This constraint targets only minimally contrastive [+high] in a weak inflectional position.

(1) Examples of Lena metaphony in the masculine singular forms (from Hualde 1989)¹.

<i>masc. sg.</i>	<i>fem. sg.</i>	<i>masc. pl.</i>	
g <u>é</u> tu	gáta	gátos	‘cat’
kord <u>í</u> ru	kordéra	kordéros	‘lamb’
ts <u>ú</u> bu	tsóba	tsóbos	‘wolf’

(2) Lena inflectional inventory².

Front	Central	Back	
/e/		/u/	High
		/o/	Mid
	/a/		Low

(3) Realization of the Lena inflectional inventory.

Front	Central	Back	
[i/e]		[u]	High
		[o]	Mid
	[a]		Low

(4) Production of [i] in the inflectional suffix but lack of height harmony (from Granda 1960).
[matéstis] ‘you pl. killed’ (cf. [matemos] ‘we kill/killed’ showing /e/ is underlying)

(5) Lena inflectional vowel inventory with contrast-coindices for backness (b) and height (h).

ti _b /te _b	tu _{b/h}
	to _{b/h}
ta	

(6) LICENSE (Height features _{[+high]inflectional unstressed V_h, σ})

Height features in a [+high] inflectional unstressed V_h must be licensed by a stressed vowel, where V_h stands for a vowel *contrast-coindexed* for height.

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¹ An accent mark over a vowel indicates stress.

² Note that the in the root system, the front vowel do contrast for height, i.e., /e, i/ are contrastive.