Height Harmony and Nasal Vowels: An Argument for Agreement by Correspondence

Overview. Vowel harmony is a phonological process wherein features from a vowel spread to other vowels in a domain. A central concern for theoretical accounts of vowel harmony is which segments do or do not trigger harmony, and under which conditions. This paper presents an argument for one such account, Agreement by Correspondence (ABC; Rose & Walker 2004). We show that ABC explains why nasal vowels do not trigger height harmony in the Recifense dialect of Brazilian Portuguese. We also examine competing proposals and show that they fail to explain the lack of vowel harmony when nasals are present.

Background. ABC is a theory originally proposed to analyze consonant harmony, but has since been expanded to account for vowel harmony as well (Rhodes 2012). The theory centers around the use of CORR constraints, which requires that pairs of output segments *correspond*, and IDENT-XY[F] constraints, which require that corresponding output segments of type X and Y must share the same value for feature F. Crucially, CORR constraints are assumed to be in a fixed ranking across languages such that constraints regulating correspondence between more similar segments are ranked higher. One of the advantages of ABC is that it explains why segments with a high degree of similarity (defined in terms of a high number of identical phonological features) tend to interact in harmony processes more often than less similar segments.

(1) RBP tonic vowel inventory

[+high]	[+ATR]	[−low]	i	u
			e	o
[−high]	[−ATR]	[+low]	ɛ	ɔ
			a	

Harmony in Recifense. The Recifense dialect of Brazilian Portuguese (RBP; da Hora & Vogeley 2013) allows seven vowels in tonic (main stressed) positions: [a e ɛ i o ɔ u], as in (1). In pretonic, unstressed environments, the high-mid vowels [e o] are generally not allowed; words like [pɛ.ka.du] 'sin' are permitted, while *[pe.ka.du] is not. The only exception to this restriction is when [e] and [o] are the result of height harmony triggered by a [+ATR] vowel in a tonic syllable, as in (2).

(2) a. [no.'ve.lo] 'yarn' (*[nɔ.'ve.lo])
b. [peh.'deh] 'to lose' (*[pɛh.'deh])
c. [moh.'di.du] 'bitten' (*[mɔh.'di.du])
d. [peh.'di.du] 'lost' (*[pɛh.'di.du])

The harmony process is complicated, however, by tonic nasal vowels. If a tonic non-low vowel is nasal, height harmony does not occur and pre-tonic unstressed vowels must surface as low-mid, as in (3).

(3) a. [pɛh.'dẽ.du] 'losing' (*[peh.'dẽ.du])
b. [i.nɔ.'sẽ.ti] 'innocent' (*[i.no.'sẽ.ti])

Analysis. The central question of interest is why pretonic mid vowels do not harmonize in height with tonic nasal vowels. We analyze this as the result of insufficient similarity between an oral unstressed pre-tonic vowel and a nasal tonic vowel, such that harmony will not occur between them. ABC provides for just such an account, since vowel harmony only occurs between corresponding segments, which must necessarily be sufficiently similar to one another.

In our analysis, we assume the constraints CORR-EI, which requires correspondence between non-low oral vowels, and CORR-EĨ, which requires correspondence between non-low vowels that may differ in nasality. Because CORR-EI refers to more similar vowels (in terms of number of features in common), it is assumed within ABC that it is universally ranked higher than CORR-EĨ. We also assume that harmony is driven by high-ranked IDENT-VV[ATR], which requires vowels in correspondence to agree in their values of the feature [±ATR]. Finally, the restriction on high mid vowels in pre-tonic positions is captured by a constraint we refer to as *ĕ. Crucially, *ĕ is

ranked between CORR-EI and CORR-EĨ; the result is that harmony occurs to repair a violation of *ĕ when two mid vowels are oral (and therefore similar enough to correspond), but not when one is oral and one is nasal (and therefore not similar enough to correspond).

(4)

Input: /pehdeh/	ID-VV[ATR]	CORR-EI	*ĕ	CORR-EĨ
a. [pe̲h.'de̲h]	*!			
b. [pɛh.'deh]		*!		*
☞ c. [pe̲h.'de̲h]			*	

(5)

Input: /pɛhdẽdu/	ID-VV[ATR]	CORR-EI	*ĕ	CORR-EĨ
a. [pe̲h.'dẽ̲.du]	*!			
☞ b. [pɛh.'dẽ.du]				*
c. [pe̲h.'dẽ̲.du]			*!	

The interaction of these constraints is illustrated by the tableaux in (4) and (5), in which underlining indicates vowels in correspondence. In (4), candidate (a) fatally violates IDENT-VV[ATR], since the two corresponding vowels do not share the same specification for [ATR]. Candidate (b), in which the two oral non-low vowels do not correspond, incurs violations of both CORR constraints. Candidate (c), in which harmony occurs between the two corresponding vowels, is thus selected as optimal, despite violating *ĕ.

In (5), the tonic vowel is nasal, and a different optimal candidate is selected. Candidate (a) again fatally violates IDENT-VV[ATR]. While candidate (c) satisfies IDENT-VV[ATR], it violates *ĕ since it possesses an unstressed [e] in the first syllable. In this case, that violation is fatal, as the two vowels are too dissimilar to be subject to CORR-EI; the nasality of the tonic syllable has broken the correspondence relation between the vowels. Candidate (b), in which the two vowels are not in correspondence and thus vacuously satisfy IDENT-VV[ATR], is thus selected as optimal, despite violating lower-ranked CORR-EĨ.

Alternatives. Outside of ABC, harmony is typically motivated by the high ranking of a harmony-driving constraint. A ranking such as SPREAD[+ATR] ≫ *ĕ, for instance, would compel harmony even if it would create a marked unstressed pre-tonic high-mid vowel. However, there is no principled way in which to prevent nasal vowels from serving as triggers of height harmony in RBP. In fact, many theories of harmony specially promote the spreading of features from perceptually weak vowels; Kaun (1995) promotes the generalization that 'bad vowels spread.' In RBP, this would suggest that nasal vowels should be *more* compelled to trigger height harmony than oral vowels, as nasality alters the formant structure of vowels such that height contrasts are more difficult to perceive (Kingston 2007). A constraint ranking in keeping with the 'bad vowels spread' generalization, such as SPREAD[+ATR]if[+nasal] ≫ *ĕ ≫ SPREAD[+ATR], would produce a harmony pattern opposite to that found in RBP: one in which nasal vowels trigger height harmony, but oral vowels do not. Only ABC, in which it is the similarity between a trigger and a target vowel that determines whether or not harmony occurs, is able to account for the height harmony pattern observed in RBP.

References

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