Cross-category agreement as reference to general dominance

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Cross-category consonant-to-vowel assimilation is a process where the place of articulation of a consonant assimilates to that of an adjacent vowel. Outside of palatalization, no such processes are reported (Halle, Vaux & Wolfe 2000, Padgett 2011 a.o.). However, Vietnamese presents such a case: dorsal consonants within a syllable rhyme will palatalize after front vowels, and crucially, dorsal consonants after round vowels become labial-velar doubly-articulated stops ([k͡p, ŋ͡m]). The vocalic rounding causes consonantal labial stricture on an adjacent consonant.

The present model involves an agreement constraint which makes reference to general dominance relations between root nodes and place features, ignoring intermediate C-/V-place nodes. This presents a formally explicit way to differentiate between cross-category and within-category interactions: the use of general versus immediate dominance. Because the C-/V-place nodes are still present, an agreement constraint can make explicit reference to them to capture strictly within-category interactions, or ignore them as the constraint does here (similar in spirit to root-adjacent and tier-adjacent dissimilation in Selkirk 1988). This allows for consonants and vowels to share features and for constraints to compel agreement between these features without the problems of transplanar spreading that are present in other analyses, while preserving this as a natural assimilation process.

Data Vietnamese contains vowel-consonant co-occurrence restrictions within the rhyme of a syllable. Specifically, palatals, simple velars, and labial-velars are all in complementary distribution within this domain. Palatals only occur after front vowels, velars after central vowels, and labial-velars (k͡p, ŋ͡m) after back, round vowels (Thompson 1965, Phạm 2006, Kirby 2011, Kang, Phạm & Storme 2016). This is shown in (1). The case of labial-velarization is a new instance of cross-category agreement, and these data are the driving focus of the model here.

(1) Rhyme restrictions in Vietnamese. Adapted from Kang, Phạm & Storme 2016: 3.

V↓ C→	Palatal	Velar	Labial-Velar
Front	[sec] ’slanting’	*[ek]	*[ek͡p]
Central	*[ac]	[sak] ’corpse’	*[ak͡p]
Back	*[oc]	*[ok]	[sok͡p] ’shock’

Problem Modeling these processes is problematic for theories of representation for several reasons. A fundamental assumption is that assimilation processes involve the sharing or spreading of a *single* feature or node. Let us call this assumption the Naturalness of Assimilation (NoA). Disparate feature theories (DFTs), where largely disjoint feature sets define the place of vowels and consonants respectively (e.g. P = [labial], O = [+round]), cannot straightforwardly capture cross-category assimilation without weakening or abandoning NoA.

Unified Feature Theories (UFTs, e.g. Clements & Hume 1995), on the other hand, define vowels and consonants with the same set of place features by design. To account for vocalic roundedness causing consonantal labial stricture, a V-place [labial] feature must spread to an adjacent C-place node. This is an instance of transplanar spreading (TPS), which has been criticized on formal grounds (see Halle, Vaux & Wolfe 2000). (The definition of *plane* follows Odden 1994.) Additionally, treating such processes as spreading cannot also capture instances where faithfulness is required for a place feature regardless of its position in the geometry (discussed below).

Analysis The model given here assumes UFT in that consonants and vowels are both defined by the set of features [labial], [dorsal], and [coronal], thus preserving NoA. The agreement constraint operating on this structure crucially makes reference to the fact that general dominance (the transitive closure of the association relation A) is encoded in the model. The constraints for cross-category agreement within Vietnamese rhymes are given in (2).

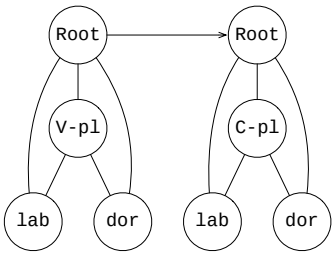
(2) a. Cross-category Agree:
$(\forall x, y)[\delta(x, y) \wedge \texttt{isLab}(x) \leftrightarrow \texttt{isLab}(y)]$
"For all root nodes x, y in a some domain δ, x generally dominates [labial] iff y generally dominates [labial]." $(\texttt{isLab}(x) \equiv (\exists y)[\texttt{Root}(x) \wedge \texttt{lab}(y) \wedge A(x, y))$

b. No Rounding (*C^w) :
$(\neg\exists w, x, y, z)[\texttt{Root}(w) \wedge \texttt{C-pl}(x) \wedge \texttt{V-pl}(y) \wedge \texttt{lab}(z) \wedge A(w, x) \wedge A(w, y) \wedge A(y, z)$
"There does not exist labial V-place on consonants."

In (2), the predicate δ is a placeholder that determines the domain of agreement; in this case, in the syllable rhyme with a dorsal consonant. The biconditional in the statement ensures that the same feature is present (or absent) in this domain in question. Note that the association relation in the model includes general dominance, which is crucially made reference to. This is shown in the resulting structure in Vietnamese, in (3).

Agreement between two segments is accomplished without necessarily spreading (see also Bakovic 2000) while retaining UFT, and thus preserving NoA. The constraints are defined in first-order logic for formal clarity, though they can also be formulated as negative literals following Jardine & Heinz 2016 (though this also requires binary place features for (2a)—a separate issue). The point being made here is not about the expressibility of the logic of the constraints, but rather the structure of the constraints themselves. What is crucial is that the agreement constraint makes reference to a single feature, to respect Naturalness of Assimilation.

(3) Resulting structure: [o$\widehat{\text{kp}}$]



Remarks The use of unified place features has a significant consequence for segment representation in general: there must be feature geometry. Feature Class Theory (FCT, Padgett 2002) cannot capture the per-segment definitions of place features, whether C-place or V-place, so this must be encoded in the model itself. In other words, UFT cannot be expressed in terms of FCT. Eschewing spreading in general allows for this constraint definition to be extended to cases of inout-output faithfulness. In Mumuye and Noni, for example, [$\widehat{\text{kp}}$] and [k^w] are in variation. This is a straightforward case where a [labial] feature is preserved, while its position in the geometry (as C- or V-place) is not, due to competing markedness conditions. Cross-category *identity* is captured with the definition here (substituting I/O correspondence for adjacency), while a spreading analysis requires a separate and non-obvious formulation for faithfulness.

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