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Spreading and correspondence in Huave vowel copy

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Abstract
Assimilation is a central phenomenon in phonology, yet there is little consensus on either its representation or computation. In particular, the empirical distinction between spreading (feature sharing) and correspondence (feature copying) is disputed. In this paper, I identify novel diagnostics from two interacting assimilation processes in San Francisco del Mar Huave (isolate: Mexico). First, vowel-copy epenthesis displays a previously unattested blocking pattern that is problematic for spreading, but predicted by feature-copying approaches like Agreement By Correspondence. Second, in CV agreement, I argue that only feature sharing driven by DEP and SPECIFY constraints can insightfully account for the role of underspecification, which produces a range of directionality effects. Huave shows that both spreading and correspondence are needed in phonological theory, and also demonstrates that monolithically assimilation-mandating constraints like AGREE can be decomposed to derive assimilation from the interaction of more elementary, independently motivated principles of markedness and faithfulness.

Keywords Assimilation · Autosegmental phonology · Feature spreading · Correspondence · Epenthetic vowels

1 Introduction

Two broad approaches to assimilation are illustrated in (1):

(1) a. Feature sharing
V C V
[-back]

b. Feature copying
V_i C V_i
[-back] [-back]

In (1a), a single feature specification [-back] is shared across two or more root nodes. This is the configuration yielded by classic autosegmental spreading (e.g. Goldsmith 1976; Hayes 1986a). By contrast, in (1b), two or more segments each bear

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their own value for [±back], as a result of the phonological grammar establishing a relationship between them that mandates feature copying or otherwise requires them to match in value for [±back] (e.g. Chomsky and Halle 1968; Cole and Kisseberth 1994; Krämer 2003; Nevins 2010). A prominent current version of the latter approach is Agreement By Correspondence, henceforth ABC (Rose and Walker 2004; Hansson 2010a).

Given these similar analytical options, one can ask whether there is any empirical distinction between spreading and correspondence. For example, blocking by interveners was previously considered diagnostic for spreading (Rose and Walker 2004), but blocking effects are in fact also predicted in ABC (Hansson 2007) as well as in Optimal Domains Theory (Cole and Kisseberth 1994). Phonetic traces of propagating features on non-contrastive interveners have been taken to indicate spreading (e.g. Gafos and Benus 2007), on the assumption that spreading is obliged to never skip segments (Strict Locality; Gafos 1999). However, the logic of Strict Locality is based on assumptions about the well-formedness of precedence relations (Archangeli and Pulleyblank 1994), in particular the idea that features are "continuous, uninterrupted, unitary" entities similar to phonetic gestures (Scobbie 1991, 87). If one subscribes to theories about relativized locality that allow representations to be non-linear at pre-surface levels where assimilation and other processes take place (e.g. Steriade 1986; McCarthy 1989; Odden 1994), the phonetics-of-interveners diagnostic is unavailable. Additional disagreement exists about whether coarticulation should be distinguished from categorical assimilation for purposes of assessing representations (Zsiga 1995, 1997; Bessell 1998; Flemming 2001).

Other proposed diagnostics of linked (associated) versus non-linked structures are either inconclusive or not generally applicable to contexts of the type in (1). Propagation of prosodic properties (e.g. where vowels match for length) favors correspondence, since non-featural properties cannot form multiply-linked spreading configurations (Kitto and de Lacy 1999; Stanton and Zukoff 2018). There are very few well-documented examples of this type, however, and at least some claims of prosodic assimilation have been questioned upon closer empirical scrutiny (Scottish Gaelic: Morrison 2018, 2019; Ho-Chunk: Hall and Sue 2018). Blumenfeld and Toivonen (2016) claim that cases of mixed behavior, where a segment is active in one process but neutral in another, favor correspondence. However, Jurgec (2011, 353) argues that at least one subset of such cases, which in any event are rare, actually constitute evidence against ABC. Lastly, some classic diagnostics of linked versus non-linked structures, such as inalterability (Steriade 1982; Hayes 1986b) or uniform behavior (Odden 1981), rely on the existence of phonological processes that tend to take place in local configurations rather than the non-local ones in (1).

In short, the distinction between spreading and correspondence is murky, so many recent proposals about distinguishing the two rely instead on typological evidence about broad classes of phenomena, rather than focusing on the disambiguation of individual cases (e.g. Kawahara 2007; Inkelas and Shih 2014). In this paper, I contribute to the understanding of this issue by presenting novel diagnostics from two interacting processes of assimilation in the language isolate Huave as spoken in San Francisco del Mar, Oaxaca State, Mexico.[1] This variety of Huave has a pro-

[1] The ISO-639-3 code for the language is hue; the Glottocode is sanf1258.

cess of vowel-copy epenthesis across an intervening consonant (V_1CV_2), where V_2 is epenthetic. The examples in (2) show vowel epenthesis with the 3PL suffix (Kim 2008, 147–148).

(2)	a.	uC-**u**	a-ʃ**u**m-**u**hw TV-find-3PL	'they find (it)'	[aʃumuh][2]
	b.	uC^j-**i**	a-mb**u**ʎ-**i**hw TV-burn-3PL	'they burn (it)'	[ambuʎjʊɸ]

In (2a), we see that the root vowel is copied to a position immediately preceding the suffixal consonant. However, there is also a preference for CV sequences to agree for the feature [±back]. In (2b), the requirements of vowel copy and CV agreement interact because they favor conflicting values for [±back] in the epenthetic vowel: specifically, faithful vowel copy would result in a back vowel following a palatalized consonant. In this case, CV agreement wins, and vowel copy is abandoned, with insertion of the default [-back] vowel /i/.

In this article I show that Huave vowel copy is best accounted for by correspondence, because this kind of all-or-nothing blocking pattern (to my knowledge, previously unattested) cannot be captured by spreading, but is straightforwardly predicted in ABC. In contrast, I show that CV agreement is best analyzed as sharing of a single multiply-linked feature. Evidence from differences between underlying versus epenthetic segments indicates that CV agreement is driven by anti-underspecification constraints.

The Huave case has larger implications for the formal modelling of assimilation. The analysis of CV agreement as feature-sharing is inconsistent with Inkelas and Shih's (2014) hypothesis that all assimilations are best analyzed within ABC. Instead, Huave supports the idea that both spreading and correspondence are needed in phonological theory, and that establishing their division of labor (e.g. Gallagher and Coon 2009; Hansson 2010a) remains an important issue. Within the computation of spreading, this paper follows Itô and Mester (1993, 1994), Beckman (1997), Myers (1997), Jun (2004), and others in deriving feature-sharing configurations from interaction of constraints that do not inherently mandate assimilation. Huave raises the question of how much empirical coverage can be derived without recourse to constraints like AGREE (Lombardi 1999; Bakovic 2007), ALIGN(F) (Kirchner 1993; Akinlabi 1994), or SPREAD(F) (Padgett 1995a; Walker 2000). A potentially objectionable characteristic of AGREE and SPREAD(F) is that they stipulate the desirability of assimilation in their definitions (cf. Beckman 1997, 35), rather than allowing optimal outputs to emerge via constraint interaction in line with the fundamental logic of OT (McCarthy 2002, 9; McCarthy 2011a, 198). To the extent that spreading can be decomposed into its more elementary motivations, while patterns outside the spreading typology can be accounted for by correspondence, it may be possible to link the representational aspect of assim-

[2]For clarity, the transcriptions in most examples abstract away from further processes such as diphthongization of front vowels before plain codas (Kim 2008, Ch. 3) or deletion of /w/ following a round vowel. Throughout the paper, surface pronunciations not reflected in the main examples are shown on the side in square brackets.

ilation to other dichotomies associated with it, such as the interplay of articulatory and perceptual constraints in explaining assimilatory patterns (e.g., Boersma 1998).

The structure of the paper is as follows. Section 2 provides background information on Huave phonology and describes the phenomenon of vowel-copy epenthesis. In Sect. 3, we see that vowel copy (which I will refer to as VV copy) must be analyzed as correspondence rather than spreading, and present a formal implementation in ABC. Section 4 takes a closer look at CV agreement, laying out the evidence that it is brought about by feature sharing and showing that an analysis in terms of correspondence creates contradictions in the phonological grammar. Section 5 discusses the results in their general theoretical context, and Sect. 6 briefly concludes the paper.

All Huave data are from the author's fieldwork conducted over ten visits of 2–6 weeks each, between 2004 and 2013 in San Francisco del Mar, Oaxaca, Mexico. Audio recordings are publicly available online through the Archive of the Indigenous Languages of Latin America (Kim n.d.), and copies of field notes from 2004 to 2008 are held at the Survey of California and Other Indian Languages at the University of California, Berkeley. Except where variation is explicitly noted, all patterns described here were produced consistently by the four speakers who participated most extensively in the research. The descriptions are also fully consistent with the speech of another 20 or so speakers who participated to varying degrees, although complete data sets are not necessarily available for each individual speaker.

2 Huave vowel copy epenthesis: The basic pattern

2.1 Background on Huave phonology

Throughout all examples in the paper, stress is uniformly final. San Francisco del Mar Huave has the following phonemic inventory as described in Kim (2008). The vowels are a standard five-vowel system /i e a o u/ with contrastive postaspiration, as shown in (3). Postaspiration corresponds to vowel length in other varieties of Huave (Suárez 1975; Noyer 2013); see Kim (2008, 29ff.) for arguments that it belongs to the vowel nucleus in the San Francisco variety as well.

(3) Vowel phonemes

	[-back]	[+back]
High	i ih	u uh
Mid	e eh	o oh
Low		a ah

The inventory of consonant phonemes is shown in (4).

(4) Consonant phonemes

	Bilabial	Dent/Alv	Palatal	Velar	Glottal
Voiceless stops	p pʲ	t	c	k kʲ kʷ	
Prenasalized stops	mb mbʲ	nd	nɟ	ŋg ŋgʲ ŋgʷ	
Affricates		ts nts	tʃ ntʃ		
Fricatives	(ɸ)	s	ʃ		h hʲ
Nasals	m mʲ	n	ɲ		
Approximants	w wʲ	l ɾ ɾʲ r rʲ	ʎ j		

The most salient organizational principle of the consonant inventory is that all consonants, except /j/, /ɸ/ and the labiovelars /kʷ ŋgʷ/, come in pairs of contrastively PLAIN and PALATALIZED versions.[3] Depending on place and manner of articulation, the contrast manifests itself in one of two different ways. First, with non-rhotic coronals, there is a contrast in primary place of articulation. As can be seen in (4), each plain consonant in the Dental/Alveolar column (aside from the rhotics) has a counterpart in the Palatal column.

Second, bilabials, velars, and glottals, along with the rhotic tap and trill, do not change their primary place of articulation, but rather the palatalized member of each pair is indicated with a superscript [ʲ]. Although I will refer to these consonants as secondarily palatalized, the palatalization is generally not realized as a secondary articulation on the consonant itself. Instead, this phonemicization is an abstraction from a contrast in effects on adjacent vowel nuclei, as illustrated in (5) with verb roots ending in /p/ versus /pʲ/.[4]

(5)

Root		3sg. completive		1sg. completive	Gloss	
/sap/	a.	t-a-sap	e.	t-a-sap-as	‘grab’	
/sapʲ/	b.	t-a-sajp	f.	t-a-sap-is	‘give a gift’	[tasapjʊs]
/ʃipʲ/	c.	t-a-ʃip	g.	t-a-ʃip-is	‘get big’	[taʃipjʊs]
/ntʃip/	d.	t-a-ntʃjəp	h.	t-a-ntʃip-as	‘approach’	

In closed syllables, the plain versus palatalized distinction on coda consonants affects the preceding nucleus. A back vowel surfaces faithfully before a plain coda consonant, as in (5a). However, a palatalized coda consonant adds a palatal offglide to a back-vowel nucleus to create diphthongs [aj] (shown in (5b)), [oj], or [uj]. The near-mirror image of this pattern is that front vowels surface faithfully before a palatalized consonant, as in (5c), but a front vowel will diphthongize to a palatal onglide plus non-front vowel before a plain consonant, as in (5d). All instances of [jə] and [jʊ]

[3] It is debatable whether /j/ exists as a consonant, or whether all attestations can be reanalyzed as diphthongal. The phoneme /ɸ/ originated as an allophone of /w/ and only occurs as underlying in morpheme-initial position, where (for historical reasons discussed below) there is limited plain-palatal contrast. The labiovelars were, in the final generations of native speakers, undergoing merger with the velars; but as this variety of Huave is moribund, there were no further developments. No attestations of labiovelars in morpheme-final position, i.e. the locus of plain-palatal contrasts, were found. Lastly, the existence of /hʲ/ is only tenuously supported by a couple of examples; it may not be part of all speakers' inventories.

[4] The prefix *t-* is the completive marker, and the prefix *a-* is glossed as a “theme vowel” by Kim (2008). The suffixal *-s* is the first-person marker; it is a mobile affix (Kim 2010), which surfaces as a suffix in this context.

come from phonemic /i/, while /e/ diphthongizes to [ja]. The diphthongization alternations are described in more detail by Kim (2008, Chap. 3), and related patterns in the San Mateo variety of Huave are treated by Noyer (2013).

Meanwhile, in the suffixed forms in (5e)–(5h), the plain versus palatalized status of the consonant manifests itself in the quality of the *following* epenthetic vowel. Here, the root-final consonant has resyllabified into the onset when preceding a suffix. These suffix vowels are examples of the vowel copy epenthesis to be analyzed in this paper. While the root vowels surface directly as monophthongs, we see [+back] epenthetic vowels following the plain root-final consonants in (5e), (5h), and [-back] epenthetic vowels following the palatalized root-final consonants in (5f), (5g).

A few further details complete the basic description of how the plain-palatal contrast is realized. Coronal consonants with a palatal primary place of articulation show the same effects on adjacent vowel nuclei as those in (5), except for the diphthongization shown in (5b). An analogous example to (5b) is shown in (6a), with a back vowel followed by a palatal consonant.

(6)	Root	3sg. completive		3PL completive		Gloss	
	/soc/	a.	t-a-soc	b.	t-a-soc-ihw	'rub, whet'	[tasocjʊɸ]
	/ntsor/	c.	t-a-ntsor	d.	t-a-ntsor-ohw	'bark'	[tantsoroh][5]
	/htsorʲ/	e.	t-a-htsor	f.	t-a-htsor-ihw	'leave'	[tahtsorjʊɸ]

Kim (2008, Sect. 3.3) reports that while there is some coarticulatory fronting on the [o] in words like (6a), it falls short of the prominent [j] offglide in words like (5b), and that unlike (5f), the phonetic offglide is not noticeably attenuated upon suffixation in forms like (6b).

The remaining exception to the realizational strategies shown in (5) is that phonemically palatalized coda rhotics do not induce any audible effects on a preceding nucleus (Kim 2008, 51). The nuclei in (6c), (6e) are both monophthongal, but when an epenthetic vowel is added in a suffix, we see the contrast between root-final rhotics that induce a [+back] vowel (6d) and those that induce a [-back] vowel (6f)—analyzed as an underlying contrast between a plain rhotic in 'bark' versus a palatal rhotic in 'leave.'

A crucial point to note is that because the contrast between plain and palatalized consonants arose historically from loss of final vowels (Suárez 1975; Noyer 2012), it is generally limited to morpheme-final position. A few of Suárez's (1975) reconstructions are shown in (7).[6]

[5]This form demonstrates regular labial dissimilation, in which coda /w/ is deleted following a [+round] nucleus (Kim 2008, 80). In (6a), (6c), underlying /hw/ fuses to yield surface [ɸ] (Kim 2008, 32ff.).

[6]The acute accent [´] marks high tone, and the grave accent [`] low tone; the tonal contrast has been lost in the San Francisco variety but is reproduced from Suárez's examples for the sake of fidelity. In (7f), Suárez (1975, 7) uses *A to denote a non-high vowel whose correspondence set is distinct from that of *a, probably due to poorly understood effects of nasalization, which tends to be present in the context of *A.

(7)	a.	*-là:ka	>	/lahk/	[lahk]	‘ear’
	b.	*-lá:kI	>	/lak^j/	[lajk]	‘tooth’
	c.	*olo	>	/ul/	[ul]	‘maize cob’
	d.	*a-ólI	>	/a-ol^j/	[aoʎ]	‘to tie,’ 3sg present
	e.	*-wisi	>	/wiʃ/	[wiʃ]	‘hand’
	f.	*kIsᴀ	>	/kis/	[kjʊs]	‘dog’

As seen in (7), the Proto-Huave contrast between final back vowels and final front vowels was transferred, via secondary split, onto a plain (back) versus palatalized (front) contrast on the final consonant. This development happened in all four Huave varieties, so only internal reconstruction is possible. However, the final vowels were still present to varying degrees in the data of Belmar (1901) and Radin (1929), and loanword evidence also supports the reconstruction of the plain-palatalized consonantal contrast as originating in final-vowel apocope (Kim 2011; Noyer 2015).[7]

Nearly all Huave roots take the form C_1VC_2. In non-morpheme final position, there is very limited plain-palatalized contrast (mainly confined to loanwords, as discussed below). Rhotics and non-coronals show no surface distinction; for example, there is no audible secondary palatalization. For non-rhotic coronals, there is a largely predictable alternation between plain and palatal allophones, conditioned by a following lexically present (i.e., non-epenthetic) vowel; examples are given in (8).

(8) Predictable occurrence of palatals non-morpheme-finally before /i e u/

Vowel	High	Mid	Low
Front	a. **c**im ‘yesterday’ b. **ʎ**iʎ ‘fish scale’ c. **ɲ**ic ‘palm (tree, leaf)’	d. **c**ec ‘father’ e. kan**ɟ**eʎ ‘candle’ f. **ntʃ**ew ‘stupid’	i. **c**um ‘throat’ j. **tʃ**uk ‘ant’ k. **ɲ**uhc ‘thief’
Back		g. toc ‘hip’ h. soʃ ‘grass’	l. nac ‘day; name; sun’ m. tsak ‘thigh’

As shown in (8), there is a complementary distribution whereby palatals occur before front *and* high vowels /i e u/. Meanwhile, plain dentals/alveolars occur before back non-high vowels /o a/. Historically, the phonologization of the plain-palatal distinction in final position, as final vowels were being lost, seems to have supported its phonologization on the allophonic level in non-final positions, where coarticulatory patterns with following vowels were presumably similar.

The productive nature of coronal palatalization as a synchronic process is shown in active morphophonological alternations. The examples in (9) involve the completive affix *t-* and the homophonous first-person subordinate and stative/nominalizing affixes *n-*.

[7] Fossilized forms found in toponyms are another potential source of evidence, for example [ʃumeˈhama], with penultimate stress, glossed by speakers as referring to a lizard, which in the modern variety is [ham].

(9)

a.	**n-**	a-	c	b.	**ɲ-**	u-	c
	1SB	TV	eat		1SB	TV	eat
	'(that) I eat (it)'				'(that) I eat' (intrans.)		
c.	**n-**	ah-	mbiol	d.	**ɲ-**	i-	him
	NOM	TV	roll		NOM	TV	sweep
	'horse-drawn cart'				'broom'		
e.	**t-**	a-	ntʃum	f.	**c-**	u-	ntʃum
	CPL	TV	stain		CPL	TV	stain
	's/he stained (it)'				'it was stained'		
g.	**t-**	a-	c	h.	**c-**	e-	c
	CPL	TV	eat		CPL	2	eat
	's/he ate (it)'				'you ate (it)'		

These prefixes surface as plain consonants before the theme vowel *a-* in (9a), (9c), (9e), (9g). Meanwhile, they have phonologically predictable palatal allomorphs, *c-* and *ɲ-* respectively, which surface before the 2nd person affix *e-* (9h) and before theme vowels *i-* and *u-* (9b), (9d), (9f). (Theme vowels are determined by argument structure in verbs, and by morpholexical factors elsewhere.)

It remains to demonstrate that plain coronal allophones appear before lexical /o/, since the alternations in (9) have shown coronals before only four of the five vowel phonemes, /i e a u/. Although there are no prefixes consisting of *o-*, alternations in this context are confirmed in data from diminutivization, which raises all root vowels to [+high].

(10)

	Regular		Diminutive	
a.	so**n**ong	b.	**ʃ**u**ɲ**ung	'piled up'
c.	**ts**ot-	d.	**tʃ**ut-	'to sit'
e.	-**l**oj	f.	-**ʎ**uj	'soft, pliable'

In (10), we see that when roots containing /o/ are diminutivized, plain coronals become palatal in conjunction with the raising of /o/ to /u/ (Kim 2008, 320).

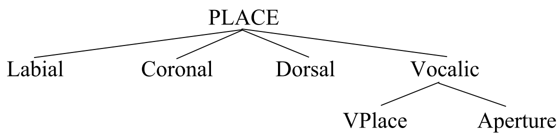
The application of palatalization before /i e u/ deserves some comment. It is typical for palatalization to occur before front vowels in some languages, and before high vowels in others (e.g., Bateman 2007; Kochetov 2011; Lahiri 2018), but the conjunction of these conditions is unusual. Suárez (1975, 20) reconstructs most instances of /u/ in San Francisco del Mar to Proto-Huave *ɨ, whose reflexes in the modern varieties are /u/, /ɨ/, or /e/. The developmental trajectory of palatalization in this context is unclear, particularly as the same Proto-Huave vowel *ɨ in final position did *not* induce palatalization on the preceding consonant when it was lost.

Synchronically, we also see a disconnect between pre-/u/ palatalization and pre-front-vowel palatalization that suggests that they are not a single, unified process. Despite the productivity of palatalization before lexically specified /u/ as seen in (9) and (10), we will see below in Sect. 2.2 and then throughout the rest of the paper that consonant palatalization in the context of epenthetic vowels turns exclusively on the [±back] parameter. Thus, while both [-back] and [+high] are attested as triggering palatalization in Huave CV interactions, I will—pending further research—treat these as separate processes which converge in cases like (9) and (10), but which diverge in vowel-copy epenthesis, where only [±back] agreement plays an active role.

2.2 Featural representations

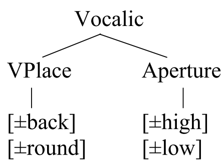
With the preceding background as a foundation, I will now set out the feature system to be used in the paper. Because the representation of palatalization is a controversial topic, the following representations are provisional, but they are intended to capture the natural classes in evidence in Huave and permit the statement of generalizations related to vowel-copy epenthesis. Following Clements and Hume (1995), I assume that consonantal and vocalic place features are segregated under separate nodes, as in (11).

(11) Segregation of consonantal and vocalic features



I will depart from Clements and Hume (1995) in using the vowel features in (12) under the Vocalic node, rather than VPlace features [labial], [coronal], [dorsal] and the scalar aperture feature [open$_n$]:

(12) Vocalic features



The features in (12) follow the approach of Ní Chiosáin (1994), who argues that Irish palatalization involves a [-back] feature under the VPlace node; as well as Halle et al. (2000), whose Revised Articulator Theory includes the vocalic features [round], [high], [low], and [back], albeit organized under different nodes than in the current system. In all these approaches, vocalic features may be used to represent both vowels, and secondary articulations on consonants.

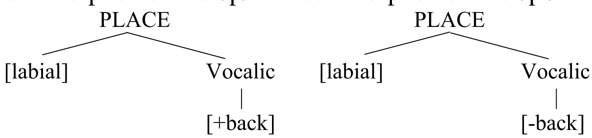
The different segment types in Huave may therefore be represented as follows. Vowel features are shown in (13). Note that all features are binary. Kim (2008, Chap. 3) argues for binary [±back] in Huave based on the diphthongization patterns seen in (5), and also notes the need for a common representational element shared by /i/ and /e/. The feature [+round] is active in various processes in Kim (2008), though its behavior is compatible with privative [round]; the status of [-round] is not crucial for present purposes.

(13) Feature specifications for vowels

	[round]	[high]	[low]	[back]
i	-	+	-	-
e	-	-	-	-
a	-	-	+	+
o	+	-	-	+
u	+	+	-	+

Consonants in morpheme-final position, which contrast for [±back], will be assigned a [+back] feature if plain, and a [-back] feature if palatal or palatalized. Sample representations of the PLACE node for /p/ and /p^j/ are given in (14). For current purposes, no underlying difference in representation is posited between secondarily palatalized consonants like in (14b) and consonants with a primary palatal place of articulation.

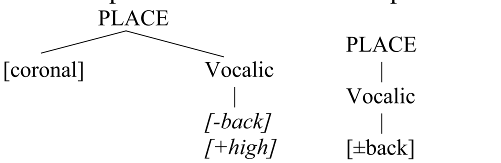
(14) a. Morpheme-final /p/ b. Morpheme-final /p^j/



In non-morpheme-final position, I assume that most consonants are underspecified for Vocalic features, since rhotics and non-coronals show no alternation, and the plain or palatal status of coronals is usually predictable from the following vowel. However, there are two situations in which non-morpheme-final consonants either acquire or come with Vocalic features, illustrated in (15). Non-underlying (i.e., acquired) features in (15a) are italicized.

(15) Compatibility of non-morpheme-final consonants with Vocalic features

a. Onset palatalization b. Prespecification



First, as illustrated in (15a), the onset palatalization facts in (8)–(10) can be thought of as the acquisition of Vocalic features [-back] and/or [+high] from a following vowel, which affects only coronals. The palatalization of coronals before [-back] and [+high] vowels suggests that they should be able to host these features, which causes them to be realized as palatal; see Lahiri (2018) for detailed discussion of [high] as a palatalization trigger. Though not crucial, I omit [+high] from the underlying representations of palatals, since there is no evidence that they propagate [+high] onto neighboring segments. For coronals which acquire [+high] from the phonological environment, I assume a redundant feature-filling process by which they also acquire [-back], since their phonetic interpretation is essentially the same as for morpheme-final palatals which are represented as [-back].

Second, the idea that many non-morpheme-final consonants are underspecified for [±back] may raise the question of compatibility with Richness of the Base (Prince and Smolensky 1993). For non-alternating onsets that agree in [±back] with a following lexical vowel, it makes little difference to the analysis whether they are underlyingly specified or not. However, there is a need to distinguish predictably alternating segments like in (9) and (10) from non-alternating onsets that conflict in [±back] value with the following vowel. This paper treats the distinction as lexical, and as such opts to capture it through different underlying representations.[8] Namely, the prespecified representation in (15b) corresponds to the fact that Huave has a number of words (mostly loanwords) in which plain coronals occur before front vowels (e.g., *Siwisen* 'city of Juchitán' < Spanish *San Vicente*), and palatals occur before back non-high vowels (e.g., *ˈʃolo* 'turkey,' a regionalism ultimately of Nahuatl origin that is used alongside the native Huave word [cuʎ]).[9] We may consider these onsets to be prespecified for [±back], and posit that palatalization is exclusively feature-filling (cf. Inkelas et al. 1997).

A final point to clarify is what counts as a "morpheme-final consonant" for the purposes of underlying specification for [±back]. Included in this category are all consonant-final roots and suffixes. As for prefixes, the only consonant-final ones belong to the "mobile affix" category, which appear as either prefixes or suffixes depending on the morphophonological context (Kim 2010). Mobile affixes include the completive -*t*- and stative -*n*- as seen in prefixal position above in (5) and (9), as well as the first-person -*s*-, seen in suffixal position in (5) and (6). In short, the mobile affixes behave as underspecified in prefixal position, being subject to palatalization as in (9), but behave as [+back] in suffixal position with respect to diphthongization and effects on epenthetic vowels in subsequent suffixes. I will not attempt a conclusive analysis of whether the prefixal and suffixal variants of mobile affixes have a single underlying representation or are listed as separate allomorphs (Kim 2015a), but will consider them to be [+back] in suffixal position, irrespective of whether that feature is lexical or whether it is acquired through other grammatical means.

2.3 Vowel copy epenthesis

Huave does not permit consonant clusters. Therefore, epenthetic vowels arise when CVC roots are concatenated with -C suffixes. In the resulting sequence CV_1C-V_2C,

[8] A reviewer raises the importance of considering the consequences for the analysis of the full set of specification options, which could for example necessitate positional faithfulness constraints according to morpheme position. It is worth noting that even apart from language-specific grey areas around systematicity, there is no standardly accepted position in the OT literature on Richness of the Base as it relates to underspecification (Inkelas 1995). Currie Hall (2007, 12) observes that this is at least partly because of disagreement on closely related issues such as Lexicon Optimization (see also other papers in Blaho et al. 2007).

[9] It is difficult to find conclusive examples of palatals before back non-high vowels, since the only such vowels are /o/ and /a/, and examples with /a/ are amenable to analysis as diphthongized /e/ → [ja] whose onglide productively fuses with preceding coronal obstruents. However, see (18b) for a robust example of /ʃo-/ that is not obviously a loan.

where V_2 is epenthetic, there are two possible broad outcomes for the vowel quality of V_2. The first one is total copy of features from V_1 to V_2. This outcome is observed wherever V_1 and the intervening consonant match in their value of [±back], namely if a front vowel is followed by a palatalized consonant (16a), (16b) or if a back vowel is followed by a plain consonant (16c), (16d), (16e).

(16) Vowel copy when V_1 and intervening C match for [±back]

a.	iCʲ-**i**	t-a-h**i**mbʲ-**i**s CPL-TV-sweep-1	'I swept'	[tahimbjʊs]
b.	eCʲ-**e**	a-k**e**ɲ-**e**hw TV-carry.on.hip-3PL	'they carry (it) on hips'	[akeɲjaɸ]
c.	uC-**u**	a-ʃ**u**m-**u**hw TV-find-3PL	'they find (it)'	[aʃumuh]
d.	oC-**o**	t-a-nd**o**k-**o**s CPL-TV-fish-1	'I fished'	
e.	aC-**a**	a-m**a**l-**a**hw TV-carry.on.head-3PL	'they carry (on head)'	

The second possible outcome is total blocking of the copy process, with insertion of a default vowel whose quality is determined solely by the [±back] value of the intervening consonant. The default vowel is /a/ after [+back] consonants, and /i/ after [-back] consonants. This outcome is observed wherever V_1 and the intervening consonant do not have the same value of [±back], i.e., if a front vowel is followed by a plain consonant (17a), (17b) or if a back vowel is followed by a palatalized consonant (17c), (17d), (17e).

(17) Default vowel insertion when V_1 and intervening C do not match for [±back]

a.	iC-**a**	a-nɟ**i**m-**a**hw TV-want-3PL	'they want (it)'	
b.	eC-**a**	u-m**e**hts-**a**w POSS-heart-3PL	'their hearts'	
c.	uCʲ-**i**	a-mb**u**ʎ-**i**hw TV-burn-3PL	'they burn (it)'	[ambuʎjʊɸ]
d.	oCʲ-**i**	a-k**o**tʃ-**i**hw TV-scratch-3PL	'they scratch (it)'	[akotʃjʊɸ]
e.	aCʲ-**i**	m-a-t**a**tʃ-**i**hw SUB-TV-reach-3PL	'(that) they reach (it)'	[matatʃjʊɸ]

To summarize, in all cases, the epenthetic V_2 matches the intervening consonant for [±back]. If V_1 also has this same value of [±back], all of V_1's features are copied to V_2. If V_1 has the opposite value of [±back], none of V_1's features are copied. In other words, vowel copy is blocked by an incompatible value of [±back] on the intervening C (Table 1).

I will argue that this pattern is best thought of as an interaction between two processes: V_2 prefers to agree with both V_1 and C, but where this is not possible, CV agreement is prioritized and VV copy is completely abandoned. Informally, we can

Table 1 Overview of full-copy versus default-insertion contexts

	Plain [+back] C	Palatalized [-back] C
Front [-back] V	Default	Copy
Back [+back] V	Copy	Default

think of this as a constraint ranking CV-AGREE ≫ VV-IDENT. In Sects. 3 and 4, we consider the exact formal structure of these conflicting requirements, and turn our attention to the puzzle of how incompatibility for [±back] can block copy of features other than [±back].

Before proceeding, I note Kitto and de Lacy's (1999) and Stanton and Zukoff's (2018) assertion that assimilation of prosodic properties is a diagnostic for correspondence. It may be possible to interpret vowel aspiration in Huave as a prosodic property of the nucleus,[10] but Huave phonology conspires to make it impossible to assess whether aspiration is copied onto epenthetic vowels. The surface generalization is that aspiration is not copied onto epenthetic vowels, as illustrated in (18a), (18b).

(18) Status of aspirated vowels

a. t-a-ʃ**ih**p-**i**s 'I bathed' [taʃihpjʊs]
CPL-TV-bathe-1

b. t-a-ʃ**oh**t-**o**s 'I rested'
CPL-TV-rest-1

c. a-m**o**nd-**o**tʃ 's/he fills (it) with solids'
TV-fill-CAUS

d. a-p**o**ts-**oh**tʃ 's/he begins (it)'
TV-begin-CAUS

However, Huave has a process of laryngeal dissimilation which deletes aspiration from the second of two aspirated vowels (Kim 2008, 81). Thus, even if aspiration were copied, the dissimilation process would be expected to delete it from the epenthetic vowel anyway. Huave does have some suffixes which appear sometimes without aspiration (18c) and sometimes with aspiration (18d), but the presence or absence of aspiration in these suffixes appears to depend on individual verb roots in a lexically idiosyncratic way. It is not conditioned by the phonology of the root's nucleus, as illustrated by the contrast in (18c), (18d), where the root nuclei are identical.

3 Vowel copy as correspondence

In this section I will first discuss whether it is possible to analyze Huave vowel copy in terms of autosegmental spreading. I argue that a spreading analysis is not viable,

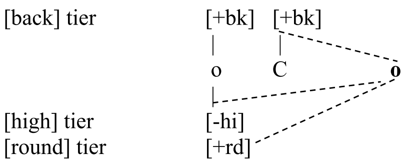
[10] Aspirated vowels correspond to nuclei in other Huave varieties that alternate between aspirated vowels and long vowels depending on stress (Suárez 1975). Although no synchronic evidence in the San Francisco variety points conclusively to vowel aspiration as being prosodic, it is mentioned since it is the only phenomenon that potentially bears on this issue from recent theoretical literature.

because of the all-or-nothing blocking pattern in which just one incompatible feature blocks copying of all other features. Then, I show how this pattern is straightforwardly predicted via constraint reranking within an Agreement By Correspondence analysis.

3.1 Problems for an autosegmental analysis

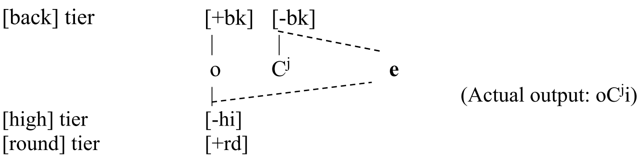
A basic tenet of Autosegmental Phonology, and one from which it derives a large amount of its predictive power, is that spreading and blocking, whether at the level of the individual feature or feature-geometric node, take place internally to tiers that are independent of each other (see Clements and Hume 1995; Steriade 1995). In the Huave cases where V_1 and C match for [±back] and vowel copy is successful, a spreading analysis is straightforward because V_2 can get each of its features by linking to the left-adjacent value on each tier, as illustrated in (19). Notice that on this analysis, where each feature is independent, the total copy results not from spreading of all V_1 features onto V_2, but rather [±back] is copied from the intervening consonant – which only coincidentally has the same [±back] value as V_1.

(19) Successful vowel copy: V_1C match for [±back]



Spreading runs into problems when attempting to model the blocking of vowel copy. Where V_1 and C have opposite values of [±back], the No Crossed Lines Constraint (Goldsmith 1976) and the concept of tier adjacency do naturally prevent [α back] on V_1 from propagating to V_2 through [-α back] on the intervening consonant, as shown in (20).

(20) Wrong prediction for Huave



However, the fact that V_1 and C must match for [±back] in order for vowel copy to be successful does not follow from anything in the theory, and must be stipulated. On other tiers in (19), the consonant bears no feature specification that would block the spread of V_1's other features to V_2. (Note that it is crucial in this scenario for palatals not to be specified as [+high], since that would block vowel-height assimilation with a mid vowel, as in (16b) *a-keɲ-ehw*.) In (20), while the failure of [+round] to spread could be accounted for by the fact that the rounded front vowel /ø/ is not in the Huave inventory (e.g. by using a co-occurrence constraint *[-BK, +RD]), the clear—and incorrect—prediction of a spreading analysis is that the height features should still be able to go through, producing a mid vowel. Again, while one could state additional conditions on the spreading of height and rounding features, the fact remains that autosegmental theory has no principle for dealing with cross-tier visibility of features.

The partial class spreading predicted in (20) is in fact attested in Barra Gaelic (Borgstrøm 1937; Clements 1986; Ní Chiosáin 1995; Stanton and Zukoff 2021). Examples (21a), (21b), (21c) are similar to Huave in that V_1 (boldfaced) and the following C agree in backness, and V_2 (underlined) is a faithful copy of V_1. However, in (21d), (21e), (21f) where V_1C disagrees in backness, we see that while propagation of [±back] is blocked, V_2 still gets its height features from V_1.

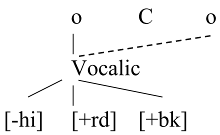
(21) Partial class behavior in Barra Gaelic data (epenthetic vowels underlined)

a.	m**e**rʲek	'rust'	d.	f**æ**rɑ k	'anger'
b.	m**ɑ**rɑv	'dead'	e.	**i**nɨxiŋʲə	'brain'
c.	g**ɔ**rɔm	'blue'	f.	m**ʌ**rʲev	'the dead'

The all-or-nothing blocking like that seen in Huave could be viewed as a type of "sour grapes" pattern (Padgett 1995a, 390).[11] Here, height and rounding are perfectly able to spread, but, metaphorically, refuse to do so out of solidarity with the blocked [±back] feature. There has been scant, if any, previous attention to this type of pattern, since feature theory in the 1990s and 2000s had a greater focus on the opposite pattern of partial spreading, where each feature under a node either spreads or does not spread depending on its own tier (see Halle et al. 2000 for a survey). For example, Halle et al. (2000) used the existence of partial spreading like in Gaelic as an argument against spreading at the level of feature-geometric nodes, since the grouping of vowel features under a unified node generally predicts that the vowel features will behave together as a unit.

Yet, the Huave pattern cannot be taken as an argument in favor of nodes. Total copy as in (19) may appear to be amenable to the analysis in (22), where V_1 simply shares an entire node of vocalic features with V_2.

(22) Vowel copy as node spreading?

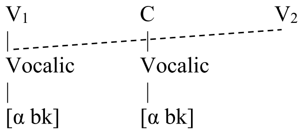


Like in (20), problems arise again when the intervening consonant interferes with this process. As with single-feature spreading, the structural description of vowel copy would need to include a stipulation that the intervening consonant must match V_1 in its value of [±back] in order for node spreading to take place. The analysis, shown in (23), now becomes unworkable. If the Vocalic node is really shared between V_1 and V_2, then the two vowels cannot actually share a Vocalic node without crossing

[11] Padgett (1995a, 393) defines "sour grapes" as the failure to violate a constraint minimally, which can produce a variety of effects, of which the Huave-type pattern is only one. A different but more common use of the term in the vowel harmony literature refers to the hypothetical case where unbounded spreading fails to be initiated at all if it will eventually be blocked somewhere downstream in the harmonic span (see McCarthy 2003).

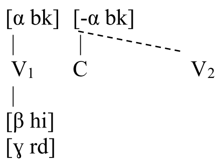
association lines projected from the intervening consonant, in violation of the No Crossed Lines Constraint.

(23) Conditions on node spreading: problems from VC interaction



If we avoid line crossing by saying that V_2 instead shares its Vocalic node with C, we are back where we started: the status of Vocalic as a node in V_1 becomes irrelevant, and in order to model the spreading patterns, we must work with the individual features. Thus, we may now revisit the incorrect prediction in (20) and consider in more detail what would be needed for the actual configuration, schematized in (24), to be the winning candidate as in (17d) *a-k**o**tʃ-**i**hw*.

(24)



To block the spread of [high] and [round] in cases where V_1C fail to match for [±back], we need to prevent [β hi] and [ɤ rd] from linking to V_2. The constraints that must be high-ranked to accomplish this are:

(25) a. *[β hi]$_{[\alpha \text{ bk}]}$, [-α bk]: Assign a violation for each instance of [high] that is linked to two segments that disagree in [back]; and

b. *[ɤ rd]$_{[\alpha \text{ bk}]}$, [-α bk]: Assign a violation for each instance of [round] that is linked to two segments that disagree in [back].

The constraints in (25) instantiate a novel schema. Normally, cooccurrence constraints may block spreading of a feature X from segment A to segment B if X is incompatible with some other feature Y of segment B. In contrast, the constraints in (25) block spreading of X in case another feature Y on segment A is not compatible with the corresponding feature Y on segment B. The problem with this constraint schema is that it runs the risk of overgenerating. These types of patterns correspond to phenomena such as parasitic harmony (Cole and Trigo 1988; Jurgec 2013) and (similarity-based) consonant harmony (Hansson 2010a; Rose and Walker 2004), which have constrained typologies. Without any restrictions on the featural combinations that can participate in this constraint schema, assimilation in any feature can be parasitic on any other feature. Because autosegmental spreading is unable to capture the Huave pattern without recourse to this unconstrained constraint type, I conclude that it is worth exploring the arguments in favor of other analyses.

3.2 Agreement By Correspondence

This section develops and argues in favor of an Agreement By Correspondence analysis, which is able to encode the competition of CV agreement and VV copy directly into a Optimality-Theoretic constraint ranking. In Agreement By Correspondence (Rose and Walker 2004), a featural relationship or dependence between segments is established by two types of constraints working together. The CORR family of constraints requires pairs or groups of segments to stand in a correspondence relationship if they meet the criteria specified in the constraint. CORR constraints are typically formulated with reference to shared features, and they are ranked in a hierarchy such that the more similar the segments are, the stronger the preference is for them to correspond. Notably, CORR constraints only mandate the establishment of correspondence; they do not place any requirements or restrictions on the realization of participating segments. That job is left to separate constraints, which in the case of assimilatory phenomena, come from the IDENT family: if segments correspond, they must bear identical values for feature [±F].

In Huave, the relevant CORR and IDENT constraints are as follows:

(26) a. CORR-V↔V: Vowels in adjacent syllables must stand in correspondence. Assign one violation for each pair of syllable-adjacent vowels within the PWord that do not correspond.[12]

b. IDENT-VV[±F]:[13] Corresponding vowel-feature matrices (consisting of backness, rounding and height features; aspiration is considered to be prosodic) must be identical in quality. Assign one violation for each feature mismatch.

The constraint IDENT-VV[±F] in (26b) is formulated as a single, multiply violable constraint; it is equivalent to a group of multiple constraints, one for each feature, which all have the same ranking relative to other constraints. This diverges from Gallagher and Coon's (2009, 555) proposal that long-distance assimilations are limited to all-or-nothing total identity enforced by a constraint IDENTITY. We adopt (26b) for the typological reasons covered at the end of this section, although either implementation would be compatible with the Huave facts.

It is probable that the constraints in (26) have some psychological reality in the static phonotactics of Huave. There is a small number of disyllabic roots in the closed class of adjectives (Kim 2008, 200), and most of these have identical vowels: e.g. *tsapah* 'thick,' *tokots* 'low, short.' However, as only epenthetic vowels show active harmony alternations, I assume a high-ranking constraint IDENT-IO[±F] which prevents lexically specified vowels from changing their features under the influence of neighboring vowels:

[12] See Kim (2015b) for further discussion of the Prosodic Word as the domain of vowel copy.

[13] Rose and Walker (2004) call this constraint family IDENT-CC, where CC stands for Corresponding segments. Because of the multiple processes at play in Huave, and the otherwise salient abbreviation of "consonant" as C, I will use C (consonant) and V (vowel) in these Ident constraints to clarify which correspondence set they apply to; see Lionnet (2014) for an alternative notational strategy. It is important to note that CORR constraints are still crucial for Huave (cf. McCarthy 2011b; Walker 2016), since they can be outranked and not all otherwise eligible sets of segments will end up corresponding in the winning candidate.

(27) IDENT-IO[±F]: Assign one violation for any feature present on a segment in the input that does not have the same value on that segment in the output.

The fact that CV agreement for [±back] takes precedence over faithful vowel copy is modelled here via a high-ranked placeholder constraint CV-AGREE, to be unpacked more fully in Sect. 4:

(28) CV-AGREE: Assign one violation for each CV sequence in which the C and V do not bear identical values for [±back].[14]

In V_1CV_2 sequences where V_1 and C have identical values of [±back], the winning candidate (15a) satisfies all of the above constraints, and there is no crucial ranking between CORR-V↔V, IDENT-VV[±F], and CV-AGREE. Subscripts in (29) index pairs of segments that are in correspondence.

(29) Outcome of V_1CV_2C where CV_2 match for [±back]

$ek^j + s$	IDENT-IO[±F]	CV-AGREE	IDENT-VV[±F]	CORR-V↔V
a. ☞ $e_xk^je_xs$				
b. $e_xk^ji_xs$			*!	
c. $e_xk^ja_xs$		*!	*	
d. ek^jis				*!
e. ek^jes				*!

Note that candidate pairs (29a), (29e) and (29b), (29d) are homophonous, differing only in their correspondence structure: in (29a), (29b) the vowels correspond, while in (29d), (29e) they do not. Because the vowels in (29d), (29e) do not correspond, they are not subject to the identity requirement of IDENT-VV[±F], which only applies to corresponding pairs, and hence they incur no violation for that constraint.

The ranking becomes crucial in the all-or-nothing blocking pattern, where it is not possible for the three constraints CORR-V↔V, IDENT-VV[±F], and CV-AGREE to be simultaneously satisfied. The key to the analysis is that the three constraints IDENT-IO[±F] and CV-AGREE and IDENT-VV[±F] all outrank CORR-V↔V. In particular, the ranking IDENT-VV[±F] ≫ CORR-V↔V means that it is more important for corresponding segments to be featurally identical than it is for them to stand in correspondence at all. In other words, if corresponding segments—i.e., those within the purview of IDENT-VV[±F]—are unable to satisfy this constraint, the preferable solution is to sacrifice the correspondence relationship in order to escape an IDENT-VV[±F] violation. This same interactional dynamic has been observed to produce dissimilatory effects by Walker (2000); Hansson (2007, 400); Gallagher and Coon (2009); Bennett (2015); and Bennett and DelBusso (2018, 17). Since the Huave case involves epenthetic vowels, as well as separate CV agreement patterns which eventually drive the selection of output form, here we have a failure of VV assimilation rather than dissimilation as such.

[14] For non-coronal or rhotic consonants, this constraint formulation would assume that they acquire [-back] values preceding front vowels, for example in (16a) and (18a), although this feature is not realized as a salient secondary palatalization.

(30) Constraint violations in V_1CV_2C where CV_2 do not match for [±back]

$ok^j + s$	IDENT-IO[±F]	CV-AGREE	IDENT-VV[±F]	CORR-V↔V	*[+RD]	*[-HI]
a. $o_xk^jo_xs$		*!			**	**
b. $o_xk^ji_xs$			*!**		*	*
c. $o_xk^je_xs$			*!*		*	**
d. ☞ ok^jis				*	*	*
e. ok^jes				*	*	**!
f. $i_xk^ji_xs$	*!**					
g. o_xko_xs	*!				**	**

As shown in (30), the ranking of CV-AGREE ≫ CORR-V↔V eliminates candidate (30a) even though it satisfies both IDENT-VV[±F] and CORR-V↔V. Candidates (30bc), which satisfy CORR-V↔V because the vowels stand in correspondence, are eliminated due to the ranking of IDENT-VV[±F] ≫ CORR-V↔V: (30b) receives three violation marks due to lack of identity in values of [±back], [±round] and [±high]; and (30c) receives two violation marks due to lack of identity in values of [±back] and [±round]. Meanwhile, "sour grapes" candidates (30de) abandon CORR-V↔V and thereby any obligation or pressure for vowel copy. Since IDENT-VV[±F] does not apply to non-corresponding vowel sequences, it can thus be vacuously satisfied. Candidates (30fg) demonstrate the ranking of IDENT-IO[±F] ≫ CORR-V↔V, as underlying feature specifications cannot be changed even if this enables satisfaction of CORR-V↔V as well as the other constraints.

To complete the Huave tableau and select the actual winning candidate (30d) over the candidate in (30e), additional constraints must favor the default vowels /i/ in [-back] consonantal contexts and /a/ in [+back] consonantal contexts. A ranking of markedness constraints *[+round] ≫ *[-high] accomplishes this.[15] The ranking is crucial because in the [+back] context, /a/ is the only vowel that satisfies *[+round], even though it violates *[-high]. In the [-back] context shown in (16), both [-back] vowels satisfy *[+round], so *[-high] is the decisive constraint, and the candidate with /i/ wins. Both of these featural markedness constraints must be ranked below IDENT-IO[±F] in order for underlying [+round] and [-high] to surface faithfully.

As a final note, we can now see that multiply violable IDENT-VV[±F]—unlike a total identity constraint of the kind used by Gallagher and Coon (2009)—enables the distinction between Huave and Barra Gaelic to be straightforwardly expressed through constraint reranking. Specifically, a minimal reranking CORR-V↔V ≫ IDENT-VV[±F] yields the Barra Gaelic partial class behavior pattern, as shown in (31). (The same result would obtain if Ident-VV[±F] were split into separate constraints, as long as they were equally ranked.) Although future research may turn up arguments in favor of a monolithic IDENTITY constraint for languages like Huave, the present analysis captures the distinction between partial and all-or-nothing assimilation with constraint reranking rather than different constraint types.

[15] It is commonly accepted that [+round] is the marked value of this feature cross-linguistically, to the extent that [round] is often taken to be a privative feature (Steriade 1995). The motivation within Huave for markedness of [–high] relies mainly on the selection of default vowels, pending further research on Huave phonology. Kim (2008, Chap. 3) uses evidence from diphthongization to propose a representation of /e/ that contains more structure than the representation of /i/, although that proposal is difficult to accommodate within standard feature theories.

(31) Partial class behavior under the reranking CORR-V↔V ≫ IDENT-VV[±F][16]

okʲ + s	IDENT-IO[±F]	CV-AGREE	CORR-V↔V	IDENT-VV[±F]
a. o_xkʲo_xs		*!		
b. o_xkʲi_xs				***!
c. ☞ o_xkʲe_xs				**
d. okʲis			*!	
e. okʲes			*!	
f. i_xkʲi_xs	*!**			
g. o_xko_xs	*!			
h. okʲas		*!	*	

Candidates (31d), (31e), the ones favored under the IDENT-VV[±F] ≫ CORR-V↔V ranking in (30), lose out when CORR is ranked more highly because the vowels are not in correspondence. Instead, the choice comes down to candidates (31bc), which obey both CV-AGREE and CORR-V↔V but at the expense of IDENT-VV[±F] violations. Candidate (31c), in which V_2 shares height features with V_1, wins because the gradient evaluation of IDENT-VV[±F] leads to a preference for sharing as many features as possible, even if total identity cannot be achieved.[17]

To summarize, the ABC analysis of Huave vowel copy models the blocking effect as an interaction between conflicting CV and VV requirements. In this way, it avoids the shortcoming of a spreading analysis, which is that the mechanisms of feature geometry are unable to deal in a principled way with blocking patterns that are contingent on tiers other than the one where the spreading process is taking place.

4 CV agreement as spreading

In the previous section, the placeholder constraint CV-AGREE was used to model the highly-ranked preference for Huave CV sequences to match or share their value of [±back], but without further probing of the operations and structures involved. In this section, I will argue that CV agreement is a case of spreading.

To preview, evidence from directionality effects in Huave indicates that CV agreement is driven by the need for underspecified segments to acquire full feature specification on the surface, causing them to link to a pre-existing feature. If only one adjacent segment bears a feature specification, an epenthetic vowel will link to it, whether it is on the left or on the right; in one case, this gives rise to VC agreement rather than CV. If both adjacent segments are potential donors, we see a preference for CV agreement over VC agreement, regardless of whether rightward or leftward spreading is needed to achieve the optimal configuration. I show that a monolithic AGREE constraint is too blunt an instrument to capture these related patterns, and

[16] Since, to my knowledge, Barra Gaelic does not insert default features in epenthetic vowels, any featural markedness constraints that may be active in its phonology are not relevant to the analysis here, and are omitted.

[17] In tableaus (30) and (31), only the two lowest constraints—those relating directly to vowel copy—have been reranked, whereas the interacting assimilation processes of CV agreement remains higher-ranked in both cases. An interesting topic for future research would be the full factorial typologies of the interactions of independent but partially overlapping assimilation processes; see Walker (2016) for some relevant considerations.

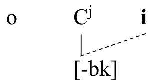
that it must be decomposed into several constraints whose relative ranking and interaction are ultimately what produce the agreement effects.

The spreading analysis is contrasted with a correspondence-based analysis, where assimilation would be driven by a need for two segments to bear identical values of a feature. The main problem with such an analysis is that a correspondence relationship for the interacting segments would have no basis in similarity, undermining the ability of ABC to capture generalizations about which sets of segments may interact both within and across languages. Furthermore, linearity conditions would need to be introduced to distinguish CV and VC sequences as separate correspondence sets. Since string-internal faithfulness constraints must be indexed to correspondence sets (to keep the conditions on CV correspondence sets separate from those on the VV correspondence sets in Sect. 3, for example), the CV constraints would need to be duplicated for the VC sets, losing the insight that both CV and VC interactions are driven by the same principles. The result is a weakening of the theory to the point where any correspondence pairs can be stipulated, while at the same time, the principles behind related patterns are artificially kept separate.

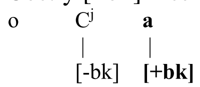
4.1 Underspecification, DEP, and multiple linkage

A core idea of the analysis proposed here is that a feature-sharing configuration between a consonant and following epenthetic vowel (CV_2) arises due to a highly ranked constraint DEP-[±bk], which penalizes insertion of a new [±back] feature and thus favors sharing of a pre-existing instance of [±back] from a neighboring segment. This idea is illustrated in (32).

(32) a. No [±bk] insertion: CV sharing



b. Costly [+bk] insertion on epenthetic V



In (33) are several constraints that can be posited as working together to motivate spreading:

(33) a. SPECIFY-[±back]: Assign a violation for each vowel or non-rhotic coronal that does not bear a specification for [±back].

b. DEP-[±back]: Assign a violation for each instance of [±back] present in the output that does not correspond to a [±back] feature in the input.

c. DEP-LINK(F): Let $[F]_i$ be a feature in the input in correspondence with $[F]_o$ in the output. Assign one violation mark for each link from $[F]_o$ to a root node in the output that exceeds the number of links from $[F]_i$ to a root node in the input.[18] (cf. Morén 2001; Torres-Tamarit 2016)

[18] An alternative name for this constraint, or a mnemonic for it, could be *SPREAD. I have chosen the DEPLINK formulation to focus on the fact that each new association line incurs a violation; and also to

The markedness constraint SPECIFY-[±BACK] in (33a), which requires each eligible segment to bear a [±back] feature, is an anti-underspecification constraint that penalizes the featureless vowel [ə] as well as consonants with no [±back] specification.[19] Similar constraints in previous literature include the SPECIFY(TONE) constraint of Myers (1997, 861) and Zoll (2003, 241), INTERPRETABILITY (Pulleyblank 1997, 91), and constraints such as HAVEPLACE (Padgett 1995a) that require certain types of features to be specified.

Next come two faithfulness constraints, DEP-[±back] and DEP-LINK(F), which correspond to two possible repairs for violations of SPECIFY. The constraint DEP-[±back] penalizes acquisition of [±back] via feature insertion, whereas DEP-LINK(F) penalizes acquisition of [±back] via linkage to an existing [±back] feature that is present in the input. This formulation of DEP-LINK(F) does not penalize links from epenthetic features to root nodes, but it does penalize links from input features to inserted root nodes (cf. Torres-Tamarit 2016, 11); its effects are separate from those of DEP-[±back].

The interaction of the constraints can be illustrated with the onset palatalization processes described in Sect. 2.1, as shown by the following tableau:

(34)

t e c | | [-bk] [-bk]	SPECIFY-[bk]	DEP-[bk]	DEP-LINK(F)
a. t e c | | [-bk] [-bk]	*!		
b. c e c | | | [-bk] [-bk] [-bk]		*!	
c. ☞ c e c ⋱| | [-bk] [-bk]			*

The ranking SPECIFY ≫ DEP-LINK(F) results in the occurrence of spreading in order to satisfy SPECIFY. Meanwhile, the ranking DEP-[±back] ≫ DEP-LINK(F) ensures that the spreading candidate (34c) wins over the insertion candidate in (34b).

Note that the direction of spreading is not stated in the analysis, but rather emerges depending on which side of the underspecified segment there is an available feature to link to. This is a desirable aspect of the analysis, since spreading is leftward onto underspecified onsets in examples like (34), but rightward from specified

highlight that together with DEP-[±bk], there emerge multiple dispreferences for adding structure. Another constraint that has been used in the literature to penalize multiple linkage is UNIQUE (Benua 1997; Beckman 1998).

[19] For reasons of space, the tableaux in this section will not consider partially specified candidates, where vowels are specified for [±back] but are missing other features. These candidates can be assumed to be eliminated by other highly-ranked constraints requiring vowel-feature specifications. Because of the special behavior of [±high] regarding palatalization, which in Sect. 2 was argued to be a distinct process not affecting vowel-copy epenthesis, the exact formulation of the other constraints would take this paper too far afield.

morpheme-final consonants to epenthetic vowels in the cases of vowel-copy epenthesis as schematized above in (32a).

Moving on to vowel-copy epenthesis, these examples reveal the role of additional constraints. Because epenthesis is triggered phonotactically by the suffixation of a consonant to a consonant-final base, epenthetic vowels are typically surrounded on *both* sides by segments that are specified for [±back]. Note that if [±back] features are available on both sides of an underspecified segment, the placeholder constraint CV-AGREE, as formulated in (28), will favor the candidate in which [±back] is linked to an onset and nucleus. The examples of epenthetic vowels in (35) illustrate the necessity of this condition.

(35) CV agreement preference over VC agreement

a.	t-a-h**i**mbʲ-**i**s CPL-TV-sweep-1	‘I swept’	[tahimbjʊs]
b.	i-hmuʎ-**i**n 2-enter-1/2PL	‘enter,’	2pl [ihmuʎjən]
c.	a-hiŋg-**a**tʃ TV-dance-CAUS	‘makes dance’	
d.	a-m**o**nd-**o**tʃ TV-fill.up.solids-CAUS	‘fills (it) with solids’	

In all the examples in (35), an epenthetic vowel inserted before a consonantal suffix still takes its [±back] feature from the preceding consonant, even though the constraint ranking in (34) does not lead to an automatic preference for one adjacent segment over another. In (35a), (35b), the epenthetic vowels in the suffix are [-back], matching the preceding root-final consonant rather than the following [+back] suffix consonant. The examples in (35c), (35d) show the opposite situation, where the epenthetic suffix vowel agrees with a preceding [+back] consonant rather than the [-back] suffixal consonant.

Returning to onset palatalization, the parallel consonantal examples to the vocalic examples in (35) are those where an underspecified onset consonant is both preceded and followed by lexical (i.e., featurally specified) vowels. Examples are given in (36), where the relevant consonant is boldfaced.

(36)

a.	/a-**s**ip/	‘swells up, gets fat’	[aʃip]
b.	/ma**nts**ik/	‘metal; machete; jail’	[mantʃjək]

In (36a), the root takes a [+back] vocalic prefix that conflicts in the value of this feature with its [-back] nucleus vowel /i/; CV agreement holds, and the consonant surfaces as palatal. Another context that illustrates the preference for CV over VC agreement, albeit rare and sporadic (see Kim 2008, 192, 200, 207), is in disyllabic roots where the vowels have opposing values of [±back], such as in (36b). Here, we see a root-medial /nts/ that palatalizes to [ntʃ] before /i/; it does not take the [+back] feature of the preceding /a/.

In sum, the direction of spreading in (36) is the opposite of that in (35), and in both cases the directionality cannot be decided by the presence vs. absence of an adjacent [±back] feature, but rather is determined by syllable structure. Both processes yield a multiply linked structure in which a [±back] feature is linked to an onset and its adjacent nucleus, whether the feature is taken from a following vowel (as in (36)), or a preceding consonant (as in (35)). In (36a), although it is conceivable that under a cyclic analysis the *a-* prefix might not be present at the stage where palatalization is effected, the root is bound, and Kim (2010) established that the *a-* prefix is structurally adjacent to the root; this makes it implausible that *a-* would be absent at the stem-level phonology, which is standardly the first cycle in stratal approaches to phonology (Bermúdez-Otero 2018). In a similar vein, although the medial consonant in (36b) is not necessarily underspecified, as it is not subject to morphophonological alternations, its behavior is compatible with either prespecification for [-back] or underspecification for [back], since palatalization of non-rhotic coronals before front vowels is the predicted behavior of underspecified consonants.

We will therefore use the following additional constraints. The constraint family NoLink is taken from Itô et al. (1995).

(37) a. NoLink-VC: Assign one violation for each feature that is linked both to a vowel and to an immediately following consonant.
b. NoLink-CV: Assign one violation for each feature that is linked both to a consonant and to an immediately following vowel.

The ranking NoLink-VC ≫ NoLink-CV encodes the preference for CV over VC agreement. The analyses of local assimilation in vowel-copy epenthesis and onset palatalization are given in (38) and (39), respectively. For clarity, the candidates show only the part of the word that contains participating segments. Note that it is no longer strictly necessary to show the constraint Dep-Link(F), since multiple linkage is required to satisfy Specify-[bk] and Dep-[bk], and the NoLink constraints are sufficient to adjudicate among remaining candidates. It is shown in (38) and (39) to illustrate the faithfulness violations and reinforce the fact that it is crucially ranked below Specify-[bk] and Dep-[bk], but it will be omitted from subsequent tableaux.

(38) Rightward spreading: CV feature sharing in vowel-copy epenthesis in (35c)
a-hiŋg-atʃ ‘makes dance’

i ŋg- tʃ | | | [-b][+b][-b]	Specify-[bk]	Dep-[bk]	NoLink-VC	NoLink-CV	Dep-Link(F)
a. i ŋg- ə tʃ | | | [-b][+b] [-b]	*!				
b. i ŋg- i tʃ | | | | [-b][+b][-b][-b]		*!			
c. ☞ i ŋg- a tʃ | |/ | [-b][+b] [-b]				*	*
d. i ŋg- i tʃ | | \\\| [-b][+b] [-b]			*!		*

(39) Leftward spreading: CV feature sharing in coronal-onset palatalization in (36a) *a-ʃip* ‘swells up’

a - s i p | | | [+b] [-b][-b]	SPECIFY-[bk]	DEP-[bk]	NOLINK-VC	NOLINK-CV	DEP-LINK(F)
a. a s i p | | | [+b] [-b][-b]	*!				
b. a ʃ i p | | | | [+b][-b][-b][-b]		*!			
c. ☞ a ʃ i p | \\\| | [+b] [-b][-b]				*	*
d. a s i p |/ | | [+b] [-b][-b]			*!		*

In effect, the constraint ranking in (38) and (39) does the work of CV-AGREE: it enforces feature sharing, while the ranking NOLINK-VC ≫ NOLINK-CV specifies that CV sharing is less marked than VC sharing. The advantage of decomposing CV-AGREE into these interacting components of faithfulness and markedness is foregrounded by a phenomenon in which the interaction of these constraints results in VC agreement rather than CV agreement, highlighting the fact that NOLINK-CV may be violated in order to satisfy higher-ranked components SPECIFY-[bk] and DEP-[bk].

Concretely, the generalization that underspecified segments draw their [±back] feature from a neighboring segment, irrespective of directionality or consonant/vowel status, extends further to an interesting case of VC agreement (rather than CV agreement) which arises with epenthetic vowels in the language’s sole infix, the valence-reducing morpheme *-rV(h)-* (presence or absence of aspiration is lexically arbitrary and varies by root). The infix is placed before a root-final consonant, so that a $C_1V_1C_2$ verb root becomes C_1V_1-rV_2-C_2. As is usual for a non-morpheme-final consonant, the /r/ does not bear an underlying specification for [±back]. Just like with suffixes, epenthetic vowel quality is determined jointly by the root vowel and the root-final consonant—except that here, the configuration is V_1rV_2C, with the root-final consonant *following* rather than preceding the epenthetic vowel (i.e., as opposed to V_1CV_2.)

In (40) are some examples of infixation with successful total vowel copy. Examples with front vowels and palatalized consonants are shown in (40a), (40b), while (40c), (40d), (40e) illustrate total copy of back vowels with plain root codas.

(40) Infixation with vowel copy

a. i-m-a-h**i**.r**i**.m Root: /himb^{j}/[20]
FUT-SUB-TV-sweep.PASS
'it will be swept'

b. a-ʃ**e**.r**e**.ŋ Root: /ʃeŋg^{j}/
TV-raise.PASS
'it is raised'

c. ɟu-s**a**-r**a**h-p Root: /sap/
PROG-catch.PASS
'it is being caught'

d. a-nd**o**.r**o**.k Root: /ndok/
TV-fish.PASS
'it is fished'

e. t-a-ʃ**u**.r**u**.m Root: /ʃum/
CPL-TV-find.PASS
'it was found'

The examples in (41) show insertion of default vowels when V_1 and the root-final C conflict in their values of [±back], specifically where V_1 is front and the root-final C is plain.

(41) Infixation with default vowels: mismatching [-back] V_1 with [+back] C

a. a-nd**i**.r**a**.m Root: /-ndim/
TV-want.PASS
'it is wanted, desirable'

b. t-a-m**i**.r**a**h.t Root: /-mit/
CPL-TV-bury.PASS
'it was buried'

The tableau for (41a) is shown in (42).

(42)

i r V m [-b] [+b]	SPECIFY-[bk]	DEP-[bk]	NOLINK-VC	NOLINK-CV
a. i r ə m [-b] [+b]	*!			
b. i r i m [-b] [-b] [+b]		*!		
c. i r i m [-b] [+b]			*	*!
d. ☞ i r a m [-b] [+b]			*	
e. i r a m [-b] [+b]			*	*!

[20] In this variety of Huave, prenasalized stops lose their stop phase in word-final position (Kim 2008, 69).

The tableau shows that when the infix vowel only finds an adjacent [±back] specification on the right-hand side, leftward spreading as in the winning candidate (42d) is preferable to rightward spreading from a more distant segment as in (42c), since (42c) violates both NoLink-VC and NoLink-CV, whereas (42d) violates only NoLink-VC.

A caveat is that infixation is not productive, and examples with roots having a back vowel and final palatalized consonant have not been found. The analysis predicts that infixation of a $CV_{[+bk]}C_{[-bk]}$ root would again yield surface VC agreement, i.e., $CV_{[+bk]}$-$rV_{[-bk]}$-$C_{[-bk]}$. Still, as far as can be discerned, the principles of vowel copy epenthesis are identical in suffixes and the infix, and strongly suggest that epenthetic vowels are free to look to suitable segments in either direction as a source of features.

4.2 Summary of the analysis

The full analysis of Huave vowel copy, integrating VV correspondence as developed in Sect. 3.2 with CV agreement as developed here, is given in (43) and (44) for successful and blocked vowel copy, respectively.

(43) Successful vowel copy (cf. (16b))

e k^j s / [-b][-b] [+b]	Ident-IO	Ident-VV	Specify	Dep[bk]	NoLinkVC	NoLinkCV	CorrVV	*[+rd]	*[-hi]
a. ☞ e_x k^j e_x s / [-b] [-b] [+b]						*			**
b. e_x k^j i_x s / [-b] [-b] [+b]		*!				*			*
c. e_x k^j a_x s / [-b] [-b] [+b]		*!*			*				**
d. e k^j i s / [-b] [-b] [+b]						*	*!		*
e. e k^j e s / [-b] [-b] [+b]						*	*!		**
f. e k^j a s / [-b] [-b] [+b]					*!		*		**
g. e k^j ə s / [-b] [-b] [+b]			*!				*		*
h. e_x k^j e_x s / [-b][-b][-b][+b]				*!					**
i. e k^j a s / [-b] [+b] [+b]	*!					*	*		**

(44) Blocked vowel copy with default insertion (cf. (17d))

o k s [+b][-b] [+b]	IDENT-IO	IDENT-VV	SPECIFY	DEP[BK]	NOLINKVC	NOLINKCV	CORRVV	*[+RD]	*[-HI]
a. o_x k o_x s [+b][-b] [+b]					*!			**	**
b. o_x k i_x s [+b][-b] [+b]		*!**				*		*	*
c. o_x k e_x s [+b][-b] [+b]		*!*				*		*	**
d. ☞ o k i s [+b][-b] [+b]						*	*	*	*
e. o k e s [+b][-b] [+b]						*	*	*	**!
f. i_x k i_x s [-b][-b] [+b]	*!					*			
g. o k ə s [+b][-b] [+b]			*!				*	*	*
h. o_x k o_x s [+b][-b][+b][+b]				*!				**	**
i. o k o s [+b][-b] [+b]					*!		*	**	**

The tableaux in (43) and (44) may be compared with that in (30) to see how the analysis of Sect. 4.1 is integrated into the overall picture. The constraint ranking in (30) was: IDENT-IO[±F], IDENT-VV[±F], CV-AGREE ≫ CORR-V↔V, *[+RD] ≫ *[-HI]. The purpose of Sect. 4.1 was to unpack the placeholder constraint CV-AGREE, which was decomposed into a three-tiered series of ranked constraints: SPECIFY-[back], DEP-[±back] ≫ NOLINKVC ≫ NOLINKCV. The highest-ranked of these constraints occupy an equivalent position in the overall ranking to the original CV-AGREE, together with IDENT-IO[±F] and IDENT-VV[±F], while the remaining constraints that achieve the CV-AGREE effect are sandwiched between that position and CORR-V↔V. While not crucial in (43) or (44), the reader may verify that the ranking NOLINKCV ≫ CORR-V↔V is necessary for the infixation case in (42), to prevent (42c) from winning over the attested output (42d).

The upshot of (43) and (44) is that the tableaux illustrate the different ways in which CV-agreement can fail to be met. Rather than having a monolithic AGREE constraint that blindly penalizes all structures not meeting the desideratum, the specific faithfulness and markedness violations incurred by the losing candidates are made explicit. For example, candidate (44h), which has inserted a [+back] feature on the epenthetic vowel in order to satisfy all of IDENT-IO[±F], IDENT-VV[±F], and CORR-V↔V, falls afoul of DEP-[±BK] and thereby demonstrates the crucial ranking DEP-[±BK] ≫ CORR-V↔V as well as DEP-[±BK] ≫ NOLINKCV. This type of decomposition of AGREE opens the door to further research to test the predictions of factorial typology in comparison with microvariation data as well as the broader landscape of cross-linguistically attested processes.

4.3 Comparison with ABC

In this section, I will sketch an ABC analysis of Huave CV agreement and discuss the problems it runs into in accounting for the full range of facts, notably the directionality reversal in infixal epenthesis. There are furthermore conceptual issues in the implementation of the analysis: it is not straightforward to define CV correspondence pairs in a system designed to derive correspondence from similarity (Rose and Walker 2004), and the existence of CV correspondence sets alongside overlapping VV correspondence sets contradicts standard assumptions about the transitivity of correspondence (Bennett 2013; Walker 2016), requiring novel mechanisms to deal with the relationship between multiple correspondence sets within the same phonological system. Taken together, these problems indicate that correspondence is unlikely to be the driving mechanism behind Huave CV agreement, and that the spreading analysis is more successful.

The following constraints can be posited in order to capture the basic pattern:

(45) a. CORR-C↔V: A consonant and immediately following vowel must correspond. Assign a violation for any onset-vowel pair that is not in correspondence.
b. IDENT-CV[±back]: Assign a violation for each pair of corresponding segments that satisfy CORR-CV but do not bear identical values of [±back].

Before moving to the tableaus, let us examine these constraints. The constraint CORR-C↔V in (45a) goes against a core principle of ABC, which is that correspondence relationships are established based on similarity as assessed through shared features (Rose and Walker 2004). Although proximity effects are sometimes observed, for example in Ndongo where nasal agreement is only enforced in adjacent syllables, Rose and Walker (2004, 494) explicitly characterize proximity as 'an independent requirement that may be imposed on interacting elements', as opposed to a possible basis for interaction in the first place; similar proposals are made by Suzuki (1998), Hansson (2010b, 232) and Bennett (2015, 61). Even Inkelas and Shih (2014), arguing in favor of an ABC analysis of local assimilations in NC clusters, define the correspondence set in terms of a shared [-continuant] feature, alongside an adjacency requirement. In contrast, CV pairs do not systematically share a feature that could be used to define the fact that they interact to the exclusion of other segment sequences. Taking this a step further, the similarity-driven nature of ABC arguably predicts that CV interaction must be accomplished by a separate mechanism such as spreading. One might be tempted to already stop here, but we shall instead pursue a fuller picture of what the analysis would have to look like in order to assess it more completely.

It is important to note that the faithfulness constraint in (45b) is indexed to corresponding CV sequences only. Because VV copy and CV agreement operate according to separate principles in Huave, the entire VCV sequence cannot stand in the same correspondence relation: VV pairs and CV sequences must be dealt with separately. This obliges us to abandon the assumption that surface correspondence is a transitive property in the sense that if X and Y correspond, and Y and Z correspond, then X and Z should correspond (cf. Bennett 2013).

Although (45b) effectively replicates some of the effects of IDENT-VV[±F], it must be separated in the analysis of CV agreement. The ranking logic goes like this. CORR-C↔V is undominated, because in all contexts there is an interaction in CV sequences. The feature-filling rather than feature-changing nature of the processes, as above in Sect. 3, is again captured by high-ranked IDENT-IO[±F]. The tableau in (46) shows the basic interaction for onset palatalization.

(46) Underspecified consonants alternate before underlyingly specified vowels

T+/i/ *or* /e/	IDENT-IO[±F]	CORR-C↔V	IDENT-CV[±back]
a. $t_x i_x$			*!
b. ☞ $c_x i_x$			
c. $t_x e_x$			*!
d. ☞ $c_x e_x$			

Tableaus for CV agreement in vowel-copy epenthesis, with schematic examples, are shown in (47) and (48).

(47) Feature-filling with epenthetic vowels: plain C

i t + V	ID-IO[±F]	CORR-C↔V	ID-CV [±back]	ID-VV [±F]	CORR-V↔V
a. $i_x t_y i_{xy}$			*!		
b. $i_x c_y i_{xy}$	*!				
c. $i_x t_y a_{xy}$				*!*	
d. ☞ $i t_y a_y$					*

(48) Feature-filling with epenthetic vowels: palatal C

ac + V	ID-IO[±F]	CORR-C↔V	ID-CV [±back]	ID-VV [±F]	CORR-V↔V
a. $a_x c_y a_{xy}$			*!		
b. $a_x t_y a_{xy}$	*!				
c. $a_x c_y i_{xy}$				*!**	
d. ☞ $a c_y i_y$					*

Because epenthetic vowels bear no underlying features, IDENT-CV-[±back] can be satisfied without violating any higher-ranked constraints, although as above in Sect. 3, the winners (47d) and (48d) do this at the cost of violating low-ranked CORR-V↔V. We focus on the most relevant candidates; others are eliminated by constraints that are not shown, such as SPECIFY and *[+round], and *[-high].

In this way, if one is willing to set aside the issues about lack of similarity-based correspondence in CV pairs, an ABC analysis can be made to work for the basic pattern. However, the additional data from infixal epenthesis create further problems. For infixal epenthesis, where we observe VC (rather than CV) agreement since only the following consonant bears a lexical [±back] feature, CORR-C↔V is too restrictive. A parallel constraint CORR-V↔C would be needed, at the cost of proliferating correspondence sets (VV, CV, and now VC) to the point where all adjacent segments plus syllable-adjacent vowels potentially stand in correspondence. Overall, this analysis would fail to capture the commonalities between suffixal and infixal epenthesis in a unified way. CORR-V↔C would furthermore lack the motivation from static phonotactics that is enjoyed by CORR-C↔V.

In sum, the feature-spreading analysis of Huave CV agreement, based on constraint interactions produced by the ranking SPECIFY ≫ DEP(F) ≫ NOLINKVC ≫ NOLINKCV, provides a more detailed account of the processes involved than does the descriptive CV-AGREE placeholder constraint, and is also more successful than an analysis based on correspondence. The overall picture that emerges is that Huave vowel-copy epenthesis features a correspondence-based vowel copy process, interacting with requirements that produce CV feature-sharing. We are now in a position to consider this division of labor between spreading and correspondence, as observed in Huave, in light of more general theoretical and typological questions about what mechanisms drive assimilation, and whether different kinds of assimilation are fundamentally distinct in their grammatical structure.

5 Discussion

Based on typological facts, Gallagher and Coon (2009) make the strong proposal that only two clusters of properties are ever found in assimilatory processes: propagation of single features, which obeys phonetically observable Strict Locality and is due to Spreading; and requirement of total identity in all features, which may hold at a distance and is produced by a Correspondence-like relationship that they term *linking*. Also looking at the cross-linguistic picture, but reaching a different conclusion, Inkelas and Shih (2014) propose to unify all assimilations—both local and long-distance—under the umbrella of ABC. They cite formal parallels between local and long-distance assimilations, and note that ABC permits elimination of sequential markedness constraints of the type *NC, which they claim are problematic in cases of markedness reversals, directionality reversals, and for their arbitrariness.

The present analysis broadly follows Rose and Walker (2004), Gallagher and Coon (2009) on Chol, Blumenfeld and Toivonen (2016) on Votic, and McCollum and Essegbey (2018) on Tutrugbu in attributing long-distance assimilation to correspondence but local assimilation to spreading,[21] in contradiction to Inkelas and Shih (2014). The correspondence analysis of Huave vowel copy also supports the idea that vowel-copy epenthesis is universally underlain by correspondence mechanisms (Kitto and de Lacy 1999; Stanton and Zukoff 2018) rather than spreading, as argued by Kawahara (2007).

A key aspect of the Huave analysis is the all-or-nothing blocking pattern in vowel copy as diagnostic of correspondence. In this section we will explore how both vowel copy (Sect. 5.1) and CV assimilation (Sect. 5.2) in Huave shed light on the distinction between processes that are based on the similarity of the interacting segments, and processes that are not. If not similarity, what else can compel segments to interact?

5.1 Blocking of long-distance interactions in ABC

The pattern of blocking in Huave vowel copy is different from other types of blocking that have been proposed within ABC. Previous approaches have placed the burden of explanation on featural (dis)similarity by relying on the evaluation of *all* interacting segments—including blockers—as potentially part of the same correspondence set. However, the key generalization in Huave is that copy is blocked by general, higher-ranking processes and requirements of the language's phonology—i.e., constraint interaction in its prototypical form—rather than by the mere presence of some

[21] Despite the typological tendency, the division of labor between spreading and correspondence may not always fall exactly along these lines. Hansson (2010b), in a study of sibilant voicing assimilation in Berber dialects, argues convincingly that both spreading and correspondence mechanisms are available to enforce the pattern. Depending on the voicing of intervening segments, the constraints determine whether it is spreading or correspondence that obtains in the winning candidate. The analysis correctly captures facts of dialectal microtypology via straightforward constraint reranking.

aspect of the representation. In this respect, Huave is similar to Votic (Blumenfeld and Toivonen 2016, 1177).

Hansson (2007, 400) was the first to observe that blocking is possible in ABC. In a sequence X... Y... Z, a non-undergoing intervener Y can block harmony in a specific situation: namely, "whenever Z is more similar to Y than it is to X." The tableau in (49) shows a hypothetical case of sibilant harmony, where [-anterior] harmony from /tʃ/ to /s/ is blocked across an intervening /z/.

(49) Blocking under Correspondence (Hansson 2007)

tʃ...z...s	*ʒ	Id[-ant]-C_LC_R	Corr-Š↔Z	Corr-Č↔S	Corr-Č↔Z	Id[+ant]-IO
a. $tʃ_i...ʒ_i...ʃ_i$	*!					**
b. $tʃ_i...z_i...ʃ_i$		*!				*
c. $tʃ_i...z_i...s_i$		*!*				
d. $tʃ_i...z_j...ʃ_i$			*!		**	*
e. ☞ $tʃ_i...z_j...s_j$				*	**	
f. $tʃ_i...z_j...ʃ_j$				*	**	*!

In line with /z/ being a non-undergoer, the high-ranked markedness constraint *ʒ rules out harmony candidate (49a). Crucially, this intervening /z/ is more similar to /s/ than to /tʃ/ by virtue of being a fricative rather than an affricate, as reflected in the fixed ranking of the CORR constraints. The optimal candidate (49e) abandons fricative-affricate correspondence in order to avoid the requirement for corresponding segments to harmonize, producing the correspondence relationships [$tʃ_i...z_j...s_j$]. All correspondence sets satisfy Id[-ant]-C_LC_R, and so there is no motivation for any violation of input-output faithfulness.

Relatedly, Stanton and Zukoff (2018, 677) formulate a constraint H[OST] E[PENTHETIC]-SEGADJ, defined in (50), that could account for blocking effects in vowel copy epenthesis. Previously, most known cases involved a restriction of vowel copy to trans-sonorant or trans-laryngeal contexts (Steriade 1986; Paradis and Prunet 1989; Hall 2003; Kawahara 2007, 20; Jurgec 2011, 233), for example in Japanese loanwords where vowel copy only takes place across a laryngeal /h/ as in [bahha] 'Bach.' Again, blocking in these cases appears to be based on similarity or lack thereof between the interacting segments.

(50) HE-SEGADJ: If some epenthetic segment α stands in correspondence with a host γ then every segment β that intervenes between α and γ must stand in correspondence with α and γ. Assign one violation mark * if this condition is not met.

This constraint enables copy to apply across some consonants but not others. Stanton and Zukoff give the example of correspondence being enforced among [+sonorant] segments. The form in (51a) satisfies HE-SEGADJ, but the form in (51b) does not, because the intervener /t/ is left out of the correspondence set. If the grammar contains another high-ranked constraint that requires corresponding segments to agree for [±sonorant], then a candidate like (51c) can emerge as optimal, having given up on correspondence—and with that, any requirements on featural identity.

(51) a. o_x t_x o_x b. o_x t o_x c. o_x t a

Despite the fact that these approaches also exploit the idea that correspondence relationships can be abandoned to satisfy higher-ranked constraints, the Huave blocking case is not of the type described by Hansson (2007), since epenthetic vowels are not more similar to intervening consonants than to the preceding syllable's vowel. In contrast to trans-sonorant and trans-laryngeal vowel copy, Huave copies vowels across consonants of all manners of articulation, so similarity is not obviously involved there either, at least not in the usual sense of similarity along a featural dimension independent of the one(s) doing the actual assimilating. While it might be possible to implement some version of Stanton and Zukoff's (2018) proposal for Huave based on agreement of VCV sequences for [±back], this paper has shown that it is not necessary to create additional constraint types beyond the standard ABC machinery.

It is instructive to contrast these similarity-based approaches to blocking with the Search-and-Copy model of Nevins (2010), which shares with ABC a mechanism for identifying interacting segments independently of the interaction that takes place between them. In Search-and-Copy, an epenthetic vowel is defective and needs a source of features. But instead of identifying a source based on similarity, legitimate sources may be defined in terms of contrast or markedness. The search proceeds outward from the epenthetic vowel, segment by segment, from the defective one until an eligible source is found from which features can be copied.

Both local and long-distance assimilations are accomplished by this same mechanism. For CV agreement, we identify the consonant preceding the epenthetic vowel as an eligible source of [±back] for V_2, by virtue of being contrastive for [±back]. The next step is to specify that only segments which match the defective segment for [±back] are eligible sources for copy of [-high], [-low], and [+round].

(52) Search-and-Copy analysis following Nevins (2010)

```
[+bk]  [-bk]i  [-bk]i
  |      |       |
  o      C^j     V
  |
[-hi, -lo, +rd]
```

As illustrated in (52), the epenthetic vowel succeeds in copying a [-back] value from the preceding consonant. However, the search for other vowel features fails because the closest possible donor (V_1) does not meet the eligibility criteria. Nevins (2010, Chap. 4) shows with reference to typological facts that in cases of a failed search caused by "defective interveners," the search is abandoned and does not continue to subsequent potential donors. Huave epenthetic vowels would thus require later insertion of default features to accompany [-back], in order to surface with full vowel quality. Such an analysis is able to derive the vowel copy and blocking facts, but its main disadvantage is that there is no explicit relationship of identity between the source and copy vowel. Rather, copy is decomposed into two processes: CV agreement for [±back], and rounding/height harmony that is parasitic on [±back].

We will leave our discussion of Search-and-Copy here, noting it as an alternative approach that is based purely on copying, a sort of hybrid between correspondence (in that the grammar specifies which segments must match for features) and spreading (in the sense that "needy" targets siphon their features from eligible triggers, reminiscent of feature-sharing). While I have argued that Huave vowel copy is similarity-based and best analyzed within ABC, the concept of "neediness" matches the intuition behind the proposed analysis of CV assimilation, to which we now turn.

5.2 DEP and the analysis of spreading

This paper has treated feature sharing, i.e. spreading, as a repair for violations of constraints against underspecification. This analysis is supported by the opportunistic nature of feature sharing, in that assimilation can go in either direction depending on where a feature can be sourced from. In contrast, CORR constraints predict that directionality reversals should be driven by similarity considerations, which is not the case for Huave. Furthermore, an ABC analysis would require a proliferation of novel types of CORR constraints.

The proposed analysis builds on the insight that epenthetic segments may poach features from their environment precisely because it is often less costly from the point of view of input-output faithfulness than insertion of a wholly new and possibly arbitrary feature or feature node/set. Examples include the connection drawn by Steriade (2001) between reduced properties of epenthetic segments and the concept of a "zero" input correspondent; Steriade's (2006) syntagmatically oriented "relational correspondence" constraints that can incentivise perceptual similarity between adjacent segments; the constraint *VPLACE in Kawahara (2007, 22) that penalizes each individual instance of a VPLACE node and thus encourages multiple linkage; and Staroverov's (2014) argument that epenthetic consonants are created from features that are split off from neighboring input segments. In contrast, an ABC analysis of Huave CV sequences cannot directly state the motivation behind CV agreement.

Regarding CV interactions, Padgett (2011, 1767) observes that these kinds of "cross-category effects often seem to involve vowels that are 'underspecified' in the sense of being either epenthetic, reduplicative, or central." These are precisely the cases where an ABC analysis is awkward due to the dissimilarity of the interacting segments, further suggesting that a mechanism other than correspondence is at play. In other words, CV interactions often involve an incomplete or defective segment, pointing to the idea that assimilation may be driven by the need for this underspecified segment to acquire features. This need can be formalized, as we have done here with the SPECIFY constraint family, which can be parametrized to refer to the required feature(s); to use different terms, it expands the existing constraint HAVE-PLACE into a family of HAVEX constraints. In the case of Huave, to use an inherently assimilation-mandating constraint such as AGREE (Lombardi 1999; Bakovic 2007), ALIGN(F) (Kirchner 1993; Akinlabi 1994), or SPREAD(F) (Padgett 1995a; Walker 2000) would have been a shorthand that obscured the inner workings of local assimilation.

Given the abundance of assimilation-producing constraints that have been proposed in the literature, the question has been raised of which ones are in need of refinement or replacement. McCarthy (2011a) criticizes AGREE for its pathological prediction of an unattested "sour grapes" pattern where spreading will not be initiated at all if it will eventually be blocked later in the word. Meanwhile, ALIGN suffers from a "too many solutions" problem (Wilson 2003). Since the assessment of ALIGN involves counting segments, it predicts various unattested interactions between harmony and segment-count-affecting processes such as epenthesis and deletion. In spite of these issues, AGREE and ALIGN continue to be used as standard constraints for assimilation, and they are expedient where the finer structure of the assimilation does not bear on the main analysis.[22] A possible reason for their persistence is that alternative constraints might require a profound reworking of the analysis. For example, McCarthy (2011a) demonstrates that a reformulated constraint SHARE(F) avoids the pathologies of AGREE and ALIGN, but only if embedded in the architecture of Harmonic Serialism. In contrast, the SPECIFY and DEP-driven spreading proposed here requires no novel machinery.

The evidence that Huave CV agreement is underlain by SPECIFY and DEP-driven feature-sharing configurations, rather than to satisfy a constraint such as AGREE, ALIGN(F), or SPREAD(F), raises larger issues about the place of autosegmental spreading in Optimality Theory. The emergence of assimilation from constraint interaction can be traced back to Itô's (1988) work on the role of CODACOND in coda-onset assimilations (see also Itô and Mester 1993, 1994). Because some features are not licensed in codas, they may end up sharing a feature with a neighboring onset whose feature is prosodically licensed (cf. spreading due to the LICENSE constraint in Itô et al. 1995). Thus, prosodic influences may create a "needy" segment even where it is not epenthetic or inherently underspecified. From a similar intuition but different perspective, Jun (2004) shows how place assimilations can be modelled by competing constraints WEAKENING (conserve articulatory effort) and PRESERVE (preserve perceptual cues for input features). Meanwhile, in Beckman's (1997) analysis of Shona, vowel-height harmony results from the interaction of positional faithfulness with featural markedness constraints. Another constraint that can derive feature-sharing configurations is the OCP (Myers 1997), to the extent that it favors candidates with fusion of adjacent identical input features. However, there is much work to be done to determine which other types of constraints and interactions (other than SPECIFY and DEP) can result in feature-sharing configurations being optimal; and whether the full typology of spreading processes can be covered without constraints like AGREE,[23] or whether a spreading imperative is a necessary primitive of phonological grammars (see Padgett 1995b; Bakovic 2007).

6 Conclusion

The overall consequence of the Huave case study examined here is that both Spreading and Correspondence exist, and use empirically distinct mechanisms. The interaction between vowel-copy epenthesis and CV agreement, whose participating segments partially overlap, reveals that vowel-copy epenthesis is best analyzed as Agreement By Correspondence due to an all-or-nothing blocking pattern that cannot be

[22] More substantively, AGREE may be appropriate to the extent that the "sour grapes" prediction may actually be borne out: see McCollum and Essegbey (2018).

[23] For example, the DEP-based approach seems to require a clear distinction between a "needy" and a "donor" segment; but the creation of the "need" via e.g. positional licensing constraints is itself a property of the analysis (see Lombardi 1999), so it remains to be seen how convincingly such constraints can be motivated across the spectrum of attested cases.

accounted for by the representational configurations of autosegmental theory. Meanwhile, CV assimilation is best analyzed as feature sharing driven by high-ranked DEP-[±back] and SPECIFY, due to the data from epenthetic vowels.

Crucially, the distinction between the two process types in Huave is revealed not by isolated examination of the alternations in question, which could well result in ambiguity between analyses that appear to be extensionally equivalent. Neither have we relied on inferences from typology. Rather, the ambiguities are resolved by examining the processes in the larger context of the language's phonology.

In Huave, we have seen that the prioritization of default epenthesis over vowel copy can successfully be modelled by dissociating VV-correspondence from CV-spreading. The different mechanisms involved in the two processes allow them to compete, rather than contradict each other. Yet we still do not know if all local interactions are spreading, and all long-distance interactions are correspondence, nor do we know the proportion of languages in which the two analyses can be disambiguated on language-internal evidence. However, this case study from Huave demonstrates that we need not rely exclusively on typological and conceptual arguments. Thus, with detailed analysis of more languages, it may be possible to discover further empirical distinctions between spreading and correspondence. More complete answers to these questions will require further work on the formal properties of models of assimilation, including the interactional possibilities for multiple processes within the same language, across the whole spectrum of assimilatory phenomena.

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Data Availability Photocopies of relevant fieldnotes are archived at the Survey of California and Other Indian Languages at the University of California, Berkeley. Audio recordings are currently in the process of being archived with the Archive for the Indigenous Languages of Latin America (AILLA) in the 'Huave Collection of Yuni Kim', publicly accessible at https://www.ailla.utexas.org/islandora/object/ailla%3A274696.

Code Availability n/a

Declarations

Competing Interests The author declares no competing interests.

References

Akinlabi, Akinbiyi. 1994. Alignment constraints in ATR harmony. *Studies in the Linguistic Sciences* 24(2): 1–18.

Archangeli, Diana, and Douglas Pulleyblank. 1994. *Grounded phonology*. Cambridge: MIT Press.

Bakovic, Eric. 2007. Local assimilation and constraint interaction. In *The Cambridge handbook of phonology*, ed. Paul de Lacy, 335–352. Cambridge: Cambridge University Press.

Bateman, Nicoleta. 2007. A cross-linguistic investigation of palatalisation. PhD diss., University of California, San Diego.

Beckman, Jill. 1997. Positional faithfulness, positional neutralisation and Shona vowel harmony. *Phonology* 14(1): 1–46.

Beckman, Jill. 1998. Positional faithfulness. PhD diss., University of Massachusetts, Amherst.

Belmar, Francisco. 1901. *Estudio del huave. Lenguas del Estado de Oaxaca*, Oaxaca, Mexico.

Bennett, William. 2013. Dissimilation, consonant harmony, and surface correspondence. PhD diss., Rutgers University.

Bennett, William. 2015. *The phonology of consonants: Harmony, dissimilation, and correspondence*. Cambridge: Cambridge University Press.

Bennett, William, and Natalie DelBusso. 2018. The typological effects of ABC constraint definitions. *Phonology* 35(1): 1–37.

Benua, Laura. 1997. Transderivational identity: Phonological relations between words. PhD diss., University of Massachusetts, Amherst.

Bermúdez-Otero, Ricardo. 2018. Stratal phonology. In *The Routledge handbook of phonological theory*, eds. S. J. Hannahs and Anna R. K. Bosch, 100–134. Abingdon: Routledge.

Bessell, Nicola. 1998. Local and non-local consonant-vowel interaction in Interior Salish. *Phonology* 15(1): 1–40.

Blaho, Sylvia, Patrik Bye, and Martin Krämer, eds. 2007. *Freedom of analysis? Studies in generative grammar 95*, Berlin: Mouton de Gruyter.

Blumenfeld, Lev, and Ida Toivonen. 2016. A featural paradox in Votic harmony. *Natural Language and Linguistic Theory* 34: 1167–1180.

Boersma, Paul. 1998. Spreading in functional phonology. University of Amsterdam. Rutgers Optimality Archive 280.

Borgstrøm, C. H. 1937. The dialect of Barra in the Outer Hebrides. *Norsk tidsskrift for sprogvidenskap* 8: 71–242.

Chomsky, Noam, and Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.

Clements, G. Nicholas. 1986. Syllabification and epenthesis in the Barra dialect of Gaelic. In *The phonological representation of suprasegmentals*, eds. Koen Bogers, Harry van der Hulst, and Maarten Mous, 317–336. Dordrecht: Foris.

Clements, G. Nicholas, and Elizabeth Hume. 1995. The internal structure of speech sounds. In *Handbook of phonological theory*, ed. John Goldsmith, 245–306. Oxford: Blackwell.

Cole, Jennifer, and Charles Kisseberth. 1994. An optimal domains theory of harmony. *Studies in the Linguistic Sciences* 24(2): 101–114.

Cole, Jennifer, and Loren Trigo. 1988. Parasitic harmony. In *Features, segmental structure and harmony processes (Part 2)*, eds. Harry van der Hulst and Norval Smith, 19–38. Dordrecht: Foris.

Currie Hall, Daniel. 2007. Laryngeal underspecification and richness of the base. In *Freedom of analysis?* eds. Sylvia Blaho, Patrik Bye, and Martin Krämer, 11–34. Berlin: Mouton de Gruyter.

Flemming, Edward. 2001. Scalar and categorical phenomena in a unified model of phonetics and phonology. *Phonology* 18(1): 7–44.

Gafos, Adamantios. 1999. *The articulatory basis of locality in phonology*. New York: Garland.
Gafos, Adamantios, and Stefan Benus. 2007. Articulatory characteristics of Hungarian ‘transparent’ vowels. *Journal of Phonetics* 35(3): 271–300.
Gallagher, Gillian, and Jessica Coon. 2009. Distinguishing total and partial identity: Evidence from Chol. *Natural Language and Linguistic Theory* 27: 545–582.
Goldsmith, John. 1976. Autosegmental phonology. PhD diss., MIT.
Hall, Nancy. 2003. Gestures and segments: vowel intrusion as overlap. PhD diss.
Hall, Nancy, and Elica Sue. 2018. Hocank (Winnebago) vowel epenthesis: A phonological re-examination in light of phonetic data. Paper presented at the 15th Old World Conference in Phonology, University College London.
Halle, Morris, Bert Vaux, and Andrew Wolfe. 2000. On feature spreading and the representation of place of articulation. *Linguistic Inquiry* 31: 387–444.
Hansson, Gunnar. 2007. Blocking effects in agreement by correspondence. *Linguistic Inquiry* 38(2): 395–409.
Hansson, Gunnar. 2010a. *Consonant harmony: Long-distance interactions in phonology*, Berkeley: University of California Press.
Hansson, Gunnar. 2010b. Long-distance voicing assimilation in Berber: Spreading and/or agreement? In *Actes du Congrès de l’ACL 2010 / 2010 CLA conference proceedings. Association canadienne de linguistique / Canadian linguistic association*, ed. Melinda Heijl.
Hayes, Bruce. 1986a. Assimilation as spreading in Toba Batak. *Linguistic Inquiry* 17(3): 467–499.
Hayes, Bruce. 1986b. Inalterability in CV phonology. *Language* 62(2): 321–351.
Inkelas, Sharon. 1995. The consequences of optimization for underspecification. In *Proceedings of NELS 26*, ed. Jill N. Beckman, 287–302. Amherst: GLSA.
Inkelas, Sharon, and Stephanie Shih. 2014. Unstable surface correspondence as the source of local conspiracies. In *Proceedings of NELS 44*, Vol. 1, 191–204.
Inkelas, Sharon, Orhan Orgun, and Cheryl Zoll. 1997. The implications of lexical exceptions for the nature of grammar. In *Derivations and constraints in phonology*, ed. Iggy Roca, 393–418. Oxford: Clarendon Press.
Itô, Junko. 1988. *Syllable theory in prosodic phonology*. New York: Garland.
Itô, Junko, and Armin Mester. 1993. Licensed segments and safe paths. *Canadian Journal of Linguistics* 38: 197–213.
Itô, Junko, and Armin Mester. 1994. Reflections on CodaCond and alignment. *Phonology at Santa Cruz* 3: 27–46.
Itô, Junko, Armin Mester, and Jaye Padgett. 1995. Licensing and underspecification in Optimality Theory. *Linguistic Inquiry* 26(4): 571–613.
Jun, Jongho. 2004. Place assimilation. In *Phonetically based phonology*, eds. Bruce Hayes, Robert Kirchner, and Donca Steriade, 58–86. Cambridge: Cambridge University Press.
Jurgec, Peter. 2011. Feature Spreading 2.0: A unified theory of assimilation. PhD diss., University of Tromsø.
Jurgec, Peter. 2013. Two types of parasitic assimilation. *Nordlyd* 40(1): 108–135.
Kawahara, Shigeto. 2007. Copying and spreading in phonological theory: Evidence from echo epenthesis. In *University of Massachusetts occasional papers in linguistics 32: Papers in Optimality Theory III*. Amherst: GLSA.
Kim, Yuni. 2008. *Topics in the phonology and morphology of San Francisco del Mar Huave*, Doctoral diss, University of California, Berkeley.
Kim, Yuni. 2010. Phonological and morphological conditions on affix order in Huave. *Morphology* 20(1): 133–163.
Kim, Yuni. 2011. Fuentes de rasgos fonológicos de préstamos castellanos en huave de San Francisco del Mar. University of Manchester.
Kim, Yuni. 2015a. Mobile affixation within a modular approach to the morphology-phonology interface. In *Affix ordering across languages and frameworks*, ed. Stela Manova, 111–123. Oxford: Oxford University Press.
Kim, Yuni. 2015b. Edge-based prosodic mapping and the prefix-stem boundary in Huave. In *Proceedings of the 45th meeting of the North East Linguistic Society*, eds. Thuy Bui and Deniz Ozyildiz. Vol. 2, 111–123. Amherst: Graduate Linguistics Student Association.
Kim, Yuni. n.d. Huave Collection of Yuni Kim. the Archive of the Indigenous Languages of Latin America, ailla.utexas.org. Access: Public. PID ailla:274689. Accessed January 18, 2022.
Kirchner, Robert. 1993. Turkish vowel harmony and disharmony: An Optimality Theoretic account. New Brunswick, NJ. Paper presented at the Rutgers Optimality Workshop 1.

Kitto, Catherine, and Paul de Lacy. 1999. Correspondence and epenthetic quality. In *Austronesian formal linguistics association VI, 181–200*. Toronto: Toronto working papers in linguistics.

Kochetov, Alexei. 2011. Palatalisation. In *The Blackwell companion to phonology*, eds. Marc van Oostendorp, Colin Ewen, Elizabeth Hume, and Keren Rice. Vol. 3, 1666–1690. Oxford: Wiley Blackwell.

Krämer, Martin. 2003. *Vowel harmony and correspondence theory*. Berlin: Mouton de Gruyter.

Lahiri, Aditi. 2018. Predicting universal phonological contrasts. In *Phonological typology*, eds. Larry Hyman and Frans Plank, 229–272. Berlin: de Gruyter Mouton.

Lionnet, Florian. 2014. Doubly triggered harmony in Laal as subphonemic agreement by correspondence. In *Proceedings of the 2013 meeting on phonology*, eds. John Kingston, Claire Moore-Cantwell, Joe Pater, and Robert Staubs. Linguistic Society of America Online Conference Proceedings.

Lombardi, Linda. 1999. Positional faithfulness and voicing assimilation in optimality theory. *Natural Language and Linguistic Theory* 17: 267–302.

McCarthy, John. 1989. Linear order in phonological representation. *Linguistic Inquiry* 20(1): 71–99.

McCarthy, John. 2002. *A thematic guide to optimality theory*. Cambridge: Cambridge University Press.

McCarthy, John. 2003. OT constraints are categorical. *Phonology* 20: 75–138.

McCarthy, John. 2011a. Autosegmental spreading in optimality theory. In *Tones and features*, eds. John Goldsmith, Elizabeth Hume, and Leo Wetzels, 195–222. Berlin: de Gruyter Mouton.

McCarthy, John. 2011b. Agreement By Correspondence without Corr constraints. Ms., University of Massachusetts, Amherst.

McCollum, Adam, and James Essegbey. 2018. Unbounded harmony is not always myopic: Evidence from Tutrugbu. In *Proceedings of WCCFL*, eds. William G. Bennett, Lindsay Hracs, and Dennis Ryan Storoshenko. Vol. 35, 251–258. Somervilla: Cascadilla.

Morén, Bruce. 2001. *Distinctiveness, coercion and sonority: A unified theory of weight*. New York: Routledge.

Morrison, Donald. 2018. Scottish Gaelic svarabhakti: Not evidence for prosodic identity in copy epenthesis. Paper presented at the 26th Manchester Phonology Meeting.

Morrison, Donald. 2019. Metrical structure in Scottish Gaelic: Tonal accent, glottalisation and overlength. *Phonology* 36: 391–432.

Myers, Scott. 1997. OCP effects in Optimality Theory. *Natural Language and Linguistic Theory* 15(4): 847–892.

Nevins, Andrew. 2010. *Locality in vowel harmony*. Cambridge: MIT Press.

Ní Chiosáin, Maire. 1994. Irish palatalisation and the representation of the place features. *Phonology* 11(1): 89–106.

Ní Chiosáin, Maire. 1995. Barra Gaelic vowel copy and (non-constituent) spreading. In *Proceedings of WCCFL 13*, eds. Raul Aranovich, William Byrne, Susanne Preuss, and Martha Senturia, 3–15. Stanford: CSLI.

Noyer, Rolf. 2012. Diccionario etimológico y comparativo de las lenguas huaves. University of Pennsylvania.

Noyer, Rolf. 2013. A generative phonology of San Mateo Huave. *International Journal of American Linguistics* 79(1): 1–60.

Noyer, Rolf. 2015. Mesoamerican linguistic contacts: The data from Huave borrowings. *Amerindia* 37(2): 313–342.

Odden, David. 1981. Problems of tone assignment in Shona. PhD diss., University of Illinois, Urbana-Champaign.

Odden, David. 1994. Adjacency parameters in phonology. *Language* 70: 289–330.

Padgett, Jaye. 1995a. Feature classes. In *Papers in Optimality Theory: University of Massachusetts occasional papers 18*, 385–420. Amherst: GLSA.

Padgett, Jaye. 1995b. Partial class behavior and nasal place assimilation. In *Proceedings of the first south western optimality workshop 1995*, eds. Keiichiro Suzuki and Dirk Elzinga. Tucson, 145–183. University of Arizona.

Padgett, Jaye. 2011. Consonant-vowel place feature interactions. In *The Blackwell companion to phonology*, eds. Marc van Oostendorp, Colin Ewen, Elizabeth Hume, and Keren Rice. Vol. 3, 1761–1786. Malden: Wiley-Blackwell.

Paradis, Carole, and Jean-François Prunet. 1989. On coronal transparency. *Phonology* 6: 317–348.

Prince, Alan, and Paul Smolensky. 1993. *Optimality theory: Constraint interaction in generative grammar*. Boulder: Rutgers University and University of Colorado.

Pulleyblank, Douglas. 1997. Optimality theory and features. In *Optimality theory: An overview*, eds. Diana Archangeli and D. Terence Langendoen, 59–101. Oxford: Blackwell.

Radin, Paul. 1929. Huave texts. *International Journal of American Linguistics* 5: 1–56.
Rose, Sharon, and Rachel Walker. 2004. A typology of consonant agreement as correspondence. *Language* 80: 475–531.
Scobbie, Jim. 1991. Attribute value phonology. PhD diss., University of Edinburgh.
Stanton, Juliet, and Sam Zukoff. 2018. Prosodic identity in copy epenthesis: Evidence for a correspondence-based approach. *Natural Language and Linguistic Theory* 36: 637–684.
Stanton, Juliet, and Sam Zukoff. 2021. Emergence of the unmarked in Scottish Gaelic copy epenthesis. NYU and USC.
Staroverov, Peter. 2014. Splitting theory and consonant epenthesis. PhD diss., Rutgers University.
Steriade, Donca. 1982. Greek prosodies and the nature of syllabification. PhD diss., MIT.
Steriade, Donca. 1986. Locality conditions and feature geometry. In *Proceedings of the North East linguistic society 17*, eds. Joyce McDonough and Bernadette Plunkett. Vol. 2, 595–618. Amherst: Graduate Linguistics Student Association.
Steriade, Donca. 1995. Underspecification and markedness. In *The handbook of phonological theory*, ed. John Goldsmith, 114–174. Oxford: Blackwell.
Steriade, Donca. 2001. The phonology of perceptibility effects: The P-map and its consequences for constraint organization. UCLA.
Steriade, Donca. 2006. Contour correspondence: Evidence from cluster interruption. Paper presented at the 3rd Old World Conference in Phonology, Budapest.
Suárez, Jorge. 1975. *Estudios huaves. Colección lingüística 22*. Mexico City: INAH.
Suzuki, Keiichiro. 1998. A typological investigation of dissimilation. PhD diss., University of Arizona.
Torres-Tamarit, Francesc. 2016. Servigliano revisited: An examination from constraint-based serialism. *Journal of Linguistics* 52(3): 689–708.
Walker, Rachel. 2000. *Nasalization, neutral segments and opacity effects*. New York: Garland.
Walker, Rachel. 2016. Surface correspondence and discrete harmony triggers. In *Proceedings of AMP 2014*.
Wilson, Colin. 2003. Analyzing unbounded spreading with constraints: Marks, targets, and derivations. Ms., University of California, Los Angeles.
Zoll, Cheryl. 2003. Optimal tone mapping. *Linguistic Inquiry* 34(2): 225–268.
Zsiga, Elizabeth. 1995. An acoustic and electropalatographic study of lexical and post-lexical palatalization in American English. In *Phonology and phonetic evidence: Papers in laboratory phonology IV*, eds. Bruce Connell and Amalia Arvaniti, 282–302. Cambridge: Cambridge University Press.
Zsiga, Elizabeth. 1997. Features, gestures, and Igbo vowels: An approach to the phonology-phonetics interface. *Language* 73(2): 227–274.