Vowel Length and Coda Cluster Interactions in Misantla Totonac

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1 Introduction

Recent research such as Licensing by Cue (LBC; Steriade 1997, 1999) has motivated phonetic explanations to replace syllabic analyses. For example, Steriade (1997) argues that laryngeal neutralization is common in coda position not because of some fact about codas *per se*, but because the phonetic properties associated with codas (specifically the fact that they do not release into vowels) make the preservation of laryngeal contrasts difficult. We can therefore dispense with references to codas and instead let our phonology refer to sequential contexts that facilitate or hinder certain contrasts. More generally, if AB is grammatical in a language but not AC, then we should explain the distinction in terms of a phonetic difference between the two sequences that makes AC perceptually weaker than AB. In contrast, the line of reasoning defended in this paper claims that AC violates some structural restriction that AB does not. While certain sequence-based approaches, especially Sonority Sequencing (Fudge 1969; Selkirk 1984; Clements 1990), are compatible with richly developed structural systems (indeed, in conjunction with her theory of sonority sequencing, Selkirk (1984) uses a syllable structure upon which the proposal below is based), when taken to their logical conclusion, these theories imply that an impoverished conception of syllable (or other prosodic) structure is sufficient for an accurate and comprehensive analysis of phonological phenomena.

As successful as these non-syllabic approaches may be, I will argue here that they are inappropriate for at least some phenomena. Misantla Totonac (MacKay 1999) shows an interaction between vowel length and coda cluster permissibility that is best analyzed as the product of syllable size constraints. The only coda clusters allowed after a long vowel are homorganic nasal-stop clusters. Other clusters are attested after short vowels but never after long vowels. Consequently, syllables and their structural properties must be retained as important tools in phonological theory.

2 Coda Clusters in Misantla Totonac

The consonantal phoneme inventory of Misantla Totonac (spoken in Veracruz, Mexico; henceforth Totonac) is given in 1.[1] The phonemic vowels in this language are /i/, /a/, /u/, /ḭ/, /a̰/, and /ṵ/, each with numerous allophones. Their long counterparts are also phonemic (MacKay 1999:30).

(1) Consonantal Phonemes (MacKay 1999:30)

	Labial	Alveolar	(Alveo)-palatal	Velar	Uvular	Glottal
Stops	p	t		k	q	ʔ
Affricates		t͡s	t͡ʃ			
Fricatives		s, ɬ	ʃ			h
Laterals	l					
Nasals	m	n				
Glides	w		j			

MacKay (1999) reports that the maximal syllable in Misantla Totonac is CCVVCC, but triconsonantal codas can appear through adjunction of fricatives. I set these triconsonantal codas aside for now, but I return to them below. Focusing on the biconsonantal clusters, Totonac has two kinds of coda clusters, homorganic nasal plus stop and (non-homorganic) stop plus fricative:

(2) Homorganic nasal-stop coda clusters
  a. *lɔɴq.ʃta̰n* ‘he/she was cold’
  b. *muu.siiŋk* ‘cave’
  c. *taŋg.wi.nḭʔ* ‘money’

(3) Stop-fricative coda clusters
  a. *tsa̰qs* ‘almost/about to’
  b. *tuu.t͡ʃu.tɔqʃ* ‘he/she is lame’
  c. *paqɬ.t͡ʃa* ‘tomato’
  d. *ʔṵt paks* ‘X is covered with dew’

In both kinds of clusters, the stop is always dorsal. This observation will become significant shortly. Interestingly, only nasal-stop clusters are permitted after long vowels (see 4). Stop-fricative clusters are never found in this environment (cf. 4d).

(4) Nasal-Stop Clusters After Long Vowels

[1] All data in this paper come from MacKay (1999). Syllabifications are given only where MacKay gives them.

a. *ki.ɬqɔɔɴɢ.nan* ‘he/she (mouth) snores’
b. *ʔḭ.ʃlaa.ɬqɔɔɴɢ.na̰* ‘his/her snores’
c. *muu.s***iiŋk** ‘cave’
d. **ki.ɬq***ɔɔqs***.t͡san*

This is not simply a phonetic consequence of nasals inducing long vowels. As 5 shows, nasals in any syllabic position can appear after short vowels.

(5) a. *pa̰ɴq.ʃwa̰ʔ* ‘smallpox’
b. *lɔɴq.ʃta̰***n** ‘he/she was cold’
c. *ta***ŋ***g.wi.***n***ḭʔ* ‘money’
d. *hɔ***ŋ***kukutaɬ* ‘DET oak grove’
e. *mi***ŋ***ka***m***a***ŋ** ‘your children’

The contrast between 4d and 3 suggests that some maximal syllable size effect is at work in Totonac. It appears that a VCC rime is acceptable while a VVCC rime is too large. But of course, this VVCC rime is perfectly grammatical if the coda cluster is of the nasal-stop variety. If the syllable-size analysis that accounts for the ungrammaticality of 4d is to be successful, we must find some difference between nasal-stop and stop-fricative clusters that allows the former to circumvent the syllable-size constraints.

Such a difference can be found in the Place features of the two kinds of clusters. Nasal place assimilation (NPA) occurs throughout the language: Nasals always take on the place of articulation of following consonants, even across syllable and morpheme boundaries (MacKay 1999). Some examples of NPA are given in 6. For reasons of space, I do not analyze this phenomenon here. In Tableaux below, I only consider candidates that undergo NPA.

(6) Nasal Place Assimilation
a. /mi**n**-pa̰ʃ-nḭ/ → *mi***m***pa̰ʃnɪ̰* ‘your pig’
b. /mi**n**-kuʃ-muu-nḭ/ → *mi***ŋ***kuʃmuun* ‘your chest’
c. /lu**n**q-ʃta̰n/ → *lɔ***ɴ***qʃta̰n* ‘he/she was cold’
d. /a̰**n**-kan-laɬ/ → *ʔa̰***ŋ***kanlaɬ* ‘someone went’
e. /ki**n**-pulḭ-Vt/ → *ki***m***pulɪ̰t* ‘my sweat’

One consequence of NPA is that nasal-stop coda clusters are always homorganic; The two consonants share a single Place node. On the other hand, every stop-fricative coda cluster is necessarily non-homorganic. As noted above, only dorsal stops (/k/ and /q/, plus their voiced allophones) appear in coda clusters. In stop-fricative clusters, [k] only appears with [s], so homorganicity is impossible in the case of /k/. Totonac has no phonemic uvular fricatives,[2] so homorganicity is ruled out when /q/ appears in a stop-fricative cluster. Homorganicity is impossible on combinatorial grounds,[3] and stop-fricative coda clusters must have two separate Place nodes, one for each consonant.

From this point of view, Totonac appears to allow only one Place feature after a long vowel. Two Place features are acceptable after short vowels. This generalization can be reframed in terms of rime “slots”: Syllables in Totonac permit maximally three rime slots. A short vowel, which occupies one of these slots, leaves room for two coda consonants (or Place nodes, more accurately), each of which fills its own rime slot. On the other hand, a long vowel fills two of the rime slots and only leaves room for one consonant (or again, Place node). Consequently, a biconsonantal coda cluster may not appear after a long vowel because such a configuration would require four rime slots. Nasal-stop clusters are exempt from this prohibition because they contain one Place node and therefore occupy only one rime slot.

An analysis along these lines must limit syllables to maximally three rime segments. This must be achieved in a way that counts long vowels as two segments and homorganic clusters as one segment. The next section develops such an analysis within Optimality Theory (Prince and Smolensky 1993).

3 An Analysis Based on Syllable Size Limitations

As I argued in the previous section, syllables in Totonac have maximally three rime segments. Three constraints conspire to generate this limitation. The first of these is *3μ, defined in 7:

(7) *3μ: *σ

μ μ μ

This constraint prohibits trimoraic syllables. It is a commonly assumed constraint in phonological theory. Languages often have a two-way weight contrast but rarely a three-way contrast. *3μ simply captures this generalization formally. The two moraic positions afforded by *3μ constitute two of the

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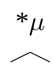
[2]/q/ optionally surfaces as [χ] post-vocalically. It is unclear from MacKay (1999) whether this spirantization occurs in coda clusters. I assume that some constraint prevents spirantization of /q/ in coda clusters.

[3]Throughout the analysis below, I assume these combinatorial facts are produced by constraints beyond the ones that play a role in my analysis.

three rime positions allowed by Totonac. The third position is non-moraic and falls to the right of the moraic segments in a way to be explained shortly.

Next, the constraint NON-BRANCHING MORAS (NBM), defined in 8, prohibits moras from dominating multiple segments.

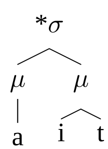
(8) NON-BRANCHING MORAS: 

Most relevantly, this constraint rules out the syllables in 9: The second half of a long vowel (9a) or diphthong (9b) must be located in a separate mora from the first half.[4] Coda consonants cannot share a mora with a vowel (9c).

(9) Syllables ruled out by NBM:

a. 

b. 

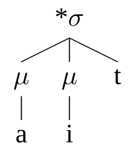
c. 

NBM finds motivation from two related sources. First, it is similar to WEIGHT-BY-POSITION (WBP): doubly-filled moras undermine the desire to assign greater weight to larger rimes. But the two constraints are also quite different. WBP motivates the projection of additional moras to ensure a one-to-one mapping from rime segment to mora. NBM encourages a one-to-one mapping with respect to existing moras only. It does not encourage adding more moras. It operates in the opposite direction from WBP: whereas WBP forces each rime segment to project a mora, NBM forces each mora to dominate just one segment. WBP will not suffice in lieu of NBM. WBP makes no

[4]Obviously, more must be said about monomoraic diphthongs. Another constraint or set of constraints might blunt the force of NBM to allow for such syllables.

distinction between 9c and 10, each of which incurs a violation because the coda consonant fails to project its own mora. If candidates with the structure of 10 are to be permitted while candidates like 9c are to be ruled out (as my analysis proposes), something other than WBP must be used.

(10)



Second, NBM makes a distinction between heavy and light nuclei. As noted above, this constraint prevents diphthongs from being monomoraic. This is desirable since diphthongs often pattern with long vowels in weight-sensitive contexts. Essentially, NBM provides a check on nuclei: when it is highly ranked, it prevents complex nuclei from being monomoraic and thus enforces a more uniform light/heavy syllable distinction.

NBM and *3μ together allow maximally two moraic segments. As indicated above, the third rime position allowed by Totonac is non-moraic. I assume that segments that are not dominated by moras may appear at the left and right edges of syllables. At the right edge, these are just onsets. For convenience, I will call such word-final segments "Tail" segments. Coda consonants may be moraic or non-moraic, and the term "Tail" just refers to the latter kind.

This is not meant to imply that non-moraic coda consonants form a constituent distinct from other rime material. Syllable structure may be completely flat (i.e., without the Onset and Tail nodes in 12 below); "Onset" and "Tail" are just convenient terms for referring to (sets of) non-moraic segments, and we can dispense with them as formal parts of the syllable.[5]

The constraint in 11 limits syllables to a single Tail segment. *Complex(Tail) (abbreviated *Comp in Tableaux) finds motivation from the convergence of two factors. Codas are universally marked, and the constraint NoCoda captures this fact. Also, WBP tells us that rime segments should bear weight. Tail segments are coda segments that do not bear weight and are therefore doubly marked. A constraint like *Complex(Tail) that seeks to minimize Tail segments would seem to be well motivated on these grounds.

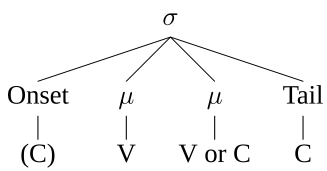
(11) *Complex(Tail): Consonant clusters within the Tail are banned.

With the ranking *Complex(Tail) $\gg$ Max, Dep, only one non-moraic coda consonant is allowed. Combined with NBM and *3μ, the maximal syl-

[5] This conception of the syllable is consistent with that proposed in McCarthy and Prince (1993), who reject any syllable structure in which the rime plays a formal role.

lable size shown in 12 (cf. Selkirk (1982)) is generated when these three constraints outrank Faithfulness constraints. NBM and *3μ allow at most two moraic segments, and *COMPLEX(Tail) allows a single Tail segment.

(12)



The ranking NBM, *3μ, *COMPLEX(Tail) $\gg$ MAX, DEP permits VCC rimes, as the Tableau in 13 for *t͡sa̰qs* 'almost/about to' shows.[6]

(13)

/t͡sa̰qs/	*3μ	NBM	*COMP	MAX	DEP
☞ a. t͡sa̰$_{\mu}$q$_{\mu}$s$_{T}$					
b. t͡sa̰$_{\mu}$q$_{\mu}$s$_{\mu}$	*!				
c. t͡s[a̰q]$_{\mu}$s$_{\mu}$		*!			
d. t͡sa̰$_{\mu}$[qs]$_{T}$			*!		
e. t͡sa̰q				*!	
f. t͡sa̰.qis					*!

Here, there are three potential rime segments, and each can be assigned to syllable position without violating any of the constraints. In candidate (b), all three rime segments are moraic, fatally violating *3μ. Candidate (c) solves this problem by uniting two of the rime segments under a single mora, but now NBM is violated. Candidate (a) avoids violating these constraints because only two moraic segments appear in that form. Candidate (d) also avoids violations of *3μ and NBM by making both coda consonants non-moraic. Unfortunately, this violates *COMPLEX(Tail). The final two candidates show that deletion and epenthesis are unnecessary in this case. All three potential rime segments can be accommodated.

A VVCC rime is ruled out, though, as 14 shows. The long vowel claims both moras, so any coda consonants must appear in the Tail (hence the failure of candidates (a) and (b)). *COMPLEX(Tail) ensures that there will be only one such consonant, ruling out candidate (c). Either deletion or epenthesis is necessary. (I will not be concerned with which strategy is preferred in Totonac. The important point is that VVCC rimes are ruled out.)

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[6]Subscripts indicate syllabic constituency where it is not obvious. μ indicates a moraic segment, and $_T$ indicates a Tail segment. Square brackets around two segments indicate that they are either both dominated by the same mora or both non-moraic.

(14)

/t͡sa̰aqs/	*3μ	NBM	*COMP	MAX	DEP
a. t͡sa̰$_\mu$a̰$_\mu$q$_\mu$s$_T$	*!				
b. t͡sa̰$_\mu$[a̰q]$_\mu$s$_T$		*!			
c. t͡sa̰$_\mu$a̰$_\mu$[qs]$_T$			*!		
☞d. t͡sa̰$_\mu$a̰$_\mu$q$_T$				*	
☞e. t͡sa̰$_\mu$a̰$_\mu$.qis					*

With only three rime segments allowed, only simplex codas are permitted in the same syllable with a long vowel. This appropriately accounts for the behavior of stop-fricative coda clusters.

Unfortunately, as the analysis stands, nasal-stop clusters are ruled out after long vowels, too. To allow nasal-stop clusters but not stop-fricative clusters in this context, the relevant constraints must be sensitive to Place specifications. The obvious place to start, then, is with 15. But this seems to make predictions about the existence of other relativized forms of *COMPLEX(Tail) which seem to be less well motivated than 15 (e.g., *COMPLEX(Tail)$_{[lateral]}$).

(15) *COMPLEX(Tail)$_{[Place]}$: Multiple Place nodes are banned in the Tail.

Fortunately, Itô and Mester (1993) provide a way to single out Place nodes as distinct from all other features. In their development of a theory of licensing segments, Itô and Mester distinguish Roots, which are root nodes, from Heads, which correspond with [place] node. Place nodes therefore occupy a special place within feature geometry: They constitute segmental Heads.

From the point of view of Itô and Mester (1993), the constraints used so far have equated segments with Roots, but we can also allow constraints to identify segments by their Heads instead. 16 modifies *COMPLEX(Tail) so that it is sensitive to Heads rather than Roots (the other constraints remain in their original Root-oriented formulations):

(16) *COMPLEX(Tail)$_H$: Within a syllable, multiple Heads are banned in the Tail.

Crucially, since nasal-stop clusters share a single Place node, they are not penalized by *COMPLEX(Tail)$_H$. This constraint sees homorganic clusters as single segments. Stop-fricative clusters are still ruled out after long vowels, but nasal-stop clusters are now permitted (to save space, in subsequent Tableaux I omit MAX and use DEP to represent the relevant Faithfulness constraints):

(17)

/muusiiŋk/ ‘cave’	*3μ	NBM	*COMP$_H$	DEP
☞a. muu.sii[ŋk]$_T$				
b. muusiiŋ.ki				*!

This analysis successfully derives the different behavior of Totonac's two kinds of coda clusters. Because they differ in their featural configurations, they are treated differently by constraint system. Long vowels occupy both moras, so they may be followed by a single segment. The permissibility of homorganic clusters after long vowels follows from the way the constraints identify segments: With a single Place node, homorganic clusters are identified as single segments. Finally, since the only homorganic coda clusters in Totonac are nasal-stop sequences, only these clusters will appear after long vowels.

But after a short vowel, there are two available rime positions. Both stop-fricative and nasal-stop clusters may appear after short vowels.

4 OCP Effects

In addition to NPA, there are two other phonotactic processes in Totonac that bear on the coda cluster facts. First, fricatives are almost always syllabified as onsets, forming clusters where necessary. Fricative+C clusters are the only onset clusters in Totonac, and C may be almost any consonant:

(18) Onset Clusters

a. *spat* 'soil/earth'
b. *sta̰.ku* 'star'
c. *sqɔ.nah* 'warm'
d. *sla.pɔχ* 'soft'
e. *smaaχ.smaaχ.wan* 'he/she cries'
f. *ʃkaɬ* 'he/she bit X'
g. *lak.ʃnuun* 'he/she stretches X'
h. *ɬta.ta* 'he/she sleeps'
i. *tɔq.ɬwan* 'he/she hiccoughs'

There are two exceptions to this generalization. First, consecutive fricatives are disallowed. The first fricative deletes in fricative-fricative sequences (MacKay 1999:56). Although I will not analyze this process here, some examples are given in 19.[7] This is probably a symptom of a more general OCP effect (Leben 1973, 1978; McCarthy 1986) in Totonac whereby similar adjacent segments are banned (MacKay 1999).

(19) Fricative Deletion

a. /i**ʃ**-**ɬ**tuk/ → *i.***ɬ***tuk* 'his/her thorn'

[7] Since deletion is preferred here, we have evidence for the ranking DEP ≫MAX.

b. /i**ʃ**-**ʃ**iila/ → *i.**ʃ**ii.la* 'his/her chair'

Second, fricative-affricate sequences cannot be tautosyllabic. The fricative becomes a coda, and the affricate becomes an onset:[8]

(20) Fricative-Affricate Syllabification

a. /i**ʃ**-**t͡s**a̰la̰n/ → *ʔḭ**s**.**t͡s**a̰.la̰ʔ* 'you sprout'

b. /t͡sa̰q**s**-**t͡ʃ**a̰n-ʃta̰n/ → *t͡sa̰q**ʃ**.**t͡ʃ**a̰n.ʃta̰n* 'he/she was about to sow X'

This phenomenon affects the syllabification of fricatives and therefore influences the distribution of stop-fricative clusters. Word-internal stop-fricative clusters appear only when they are followed by affricates (otherwise the fricative will be an onset). I analyze this as an OCP effect with the constraint in 21, which simply forces a syllable boundary to fall between adjacent stridents. It is never violated in Totonac, so I rank it alongside the syllable-size constraints from the previous section. As 22 shows, with *is.t͡sa̰.la̰n* 'you sprout,' this constraint produces the word-internal stop-fricative clusters.

(21) OCP(strid): Within a syllable, adjacent strident segments are banned.

(22)

/iʃ-t͡sa̰la̰n/	OCP(strid)	*3μ	NBM	*COMP$_H$	DEP
a. i.st͡sa̰.la̰n	*!				
☞b. is.t͡sa̰.la̰n					
c. i.ʃi.t͡sa̰.la̰n					*!

With this addition, we have the constraint ranking shown in 23.

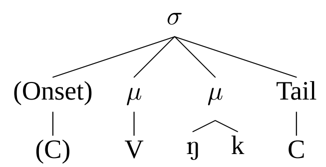
(23) OCP(strid), *3μ, NBM, *COMPLEX(Tail)$_H$ $\gg$ DEP, MAX

5 Triconsonantal Clusters

If all of the syllable-size constraints were modified to identify segments by their Heads rather than their Roots, we would predict that after a short vowel, nasal-stop clusters could be dominated by a single mora without violating NBM. As 24 indicates, such a configuration would free the Tail to be occupied by another consonant, creating a triconsonantal coda cluster.

[8] The fricative also undergoes place assimilation, taking on the Place feature of the affricate. I do not analyze this process here.

(24)



What might this third consonant be? We already know that stop-fricative sequences are permissible in codas, so perhaps the Tail in 24 could be filled with a fricative. This would create a nasal-stop-fricative cluster, a combination (of sorts) of Totonac's two kinds of biconsonantal clusters.

This is in fact a correct prediction. MacKay (1999) provides the form *nah.laχ.tʃaɴqʃ* 'he/she will chop' with just such a cluster. As 25 demonstrates, the current analysis predicts the grammaticality of this form as long as NBM is modified in the way *COMPLEX(Tail) was modified. Totonac syllables still provide just three rime positions, but homorganic clusters may now occupy any single position with no penalty, not just the Tail.

(25)

/naɬ-lak-t͡ʃanqʃ/	OCP	*3μ	NBM$_H$	*COMP$_H$	DEP
☞a. nah.laχ.t͡ʃa[ɴq]$_\mu$ʃ$_T$					
b. nah.laχ.t͡ʃa.niq$_\mu$ʃ$_T$					*!

MacKay gives no word-internal examples of triconsonantal coda clusters, but this gap is not entirely unexpected. Three factors must hold for such a cluster to surface: (i) the nasal-stop-fricative sequence must be present; (ii) this cluster must be followed by an affricate; and (iii) the preceding vowel must be short. There is a striking lack of forms that adhere to only a subset of these requirements. For example, I have found only two word-internal stop-fricative clusters in MacKay (1999). These must meet requirement (ii). The form in 25 is the only nasal-stop-fricative coda in MacKay's grammar. This form meets requirements (i) and (iii). Since so few forms that meet only a few of the criteria are attested, it is perhaps not surprising that there are no forms in MacKay (1999) that satisfy all three of the requirements.

6 Alternative Analyses

In this section I discuss other potential analyses that one might pursue to account for the distribution of coda clusters in Totonac. These analyses do not make use of syllable structure, and I argue that each is inadequate.

Since consonantal sequences are involved, Sonority Sequencing is an obvious place to turn. Stop-fricative clusters may be banned after long vowels because the difference in sonority between the consonants is insufficiently large. Nasal-stop clusters may involve a larger, satisfactory distance. But if stop-fricative clusters are licensed by sonority considerations after short vowels, it is unclear how this might change after long vowels. Sonority sequencing just compares adjacent pairs of segments, so the length of a preceding vowel cannot influence the acceptability of a sequence of consonants, and it is unclear how exactly it would influence sonority considerations. This argument holds regardless of the particular sonority scale one adopts.

More importantly, LBC is also unsatisfactory in this case. Under this approach, one must argue that stop-fricative clusters are ruled out after long vowels because the cues for one segment (or both) are suppressed. Segment-internal cues are crucial for fricatives (Kingston 2002), so the surrounding context should not affect the perception of fricatives. Transitional cues are more important for stops, so properties of adjacent segments should be more important for their perception.

But after long vowels, these transitional cues should be more salient compared to post-short-vowel contexts. With a longer vowel, there is more time for the transitional cues to be saliently manifested. Or, if the stop-influenced portion of the vowel does not increase with vowel length, there is a greater non-stop-influenced portion of the vowel to which the transitional cues can be contrasted. Identification of the consonant should be easier. Either way, stop-fricative clusters should be preferred after long vowels and disfavored after short vowels. If anything, LBC makes the wrong predictions in this case.

The failure of these approaches lends credence to the syllable-structure analysis promoted here. The behavior of stop-fricative and nasal-stop clusters in different vocalic contexts is not attributable to intrinsic phonetic properties of the segments involved, but is instead a consequence of the structural demands imposed on these clusters.

7 Conclusion

In Misantla Totonac, only a subset of the language's coda clusters are licensed after long vowels. I have argued that this is best understood as a symptom of syllable size limitations that interact with other phonotactic constraints such as NPA and the OCP. But rather than limiting syllable size in a stipulative manner (cf. Fudge (1969); Selkirk (1982); Borowsky (1986)), the analysis proposed here uses constraints that are motivated by more general markedness considerations. While non-syllabic frameworks such as LBC have made great strides in elucidating the motivations for many phonological phenomena, we cannot take its success as an indication that syllables are unnecessary theoretical constructs. Only by referring directly to syllables and their constituents can we make sense of Misantla Totonac's coda cluster facts.

I conclude by noting that the constraint system developed here has applications in other languages. In English, only coronal clusters are permitted after long vowels (Selkirk 1982): *find* [faind], but **fimp* [faimp]. This could be accounted for by modifying *COMPLEX(Tail) to rule out only non-coronal clusters, perhaps as a reflection of the unmarkedness of coronals. Only three rime segments are allowed, so clusters are generally banned after bimoraic nuclei. The unmarkedness of coronals exempts them from this limitation, much like homorganic clusters are exempt in Misantla Totonac.

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