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Positional faithfulness in Harmonic Grammar[1]

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In Tamil, coronals are licensed in onsets and initial syllables, exemplifying what Jesney (2011b) calls Licensing in Multiple Contexts (LMC). Jesney shows that while only positional faithfulness produces LMC in Optimality Theory, positional licensing provides a competing analysis of LMC in Harmonic Grammar (HG). This suggests that positional faithfulness may not be necessary in HG. We argue, though, that positional faithfulness remains essential. First, other facts in Tamil are incompatible with the positional licensing approach to LMC, rendering the positional faithfulness alternative the only viable analysis. Second, only with positional faithfulness can certain typological generalizations concerning assimilation between consonants be captured.

KEYWORDS: Harmonic Grammar, Optimality Theory, positional licensing, positional faithfulness, Tamil

1. INTRODUCTION

Phonological grammars often confine elements to particular prominent positions. For example, in Tamil (Christdas 1988, Ramasamy 2010), the short mid vowels [ɛ, ɔ] appear only in initial syllables. In Optimality Theory (OT; Prince & Smolensky 1993/2004), such phenomena are often produced with either positional licensing (Ito 1988; Zoll 1997, 1998; Crosswhite 2001; Walker 2004, 2005, 2011) or positional faithfulness (Beckman 1999). The former – a particular brand of positional markedness – penalizes elements that do not overlap with the licensing position;[2] outranking faithfulness constraints, a positional licensing constraint prohibits non-initial [ɛ, ɔ] in Tamil. Positional faithfulness, on the other

[1] We would like to thank audiences at the University of Utah, Phonology 2013, NELS 44, and the 2014 Annual Meeting of the LSA for feedback on this work. We would also like to thank the anonymous reviewers at the *Journal of Linguistics* whose feedback was invaluable. Abbreviations in glosses follow the Leipzig Glossing Rules. In addition, EMPHATIC is abbreviated EMPH.

[2] We refer to the positions that restricted elements must appear in as LICENSING POSITIONS as a descriptive characterization, regardless of the formalism – positional licensing, positional faithfulness, or something else – that gives rise to that situation.

hand, targets the licensing position for faithfulness; when it outranks a generic markedness constraint against [ɛ, ɔ], it preserves those vowels in initial syllables while the markedness constraint removes them elsewhere.

The availability of these two quite different approaches to Tamil reveals a redundancy in OT: positional licensing and positional faithfulness overlap to a considerable extent, but both appear to be necessary (each does work the other cannot; see Walker (2011), Kaplan (2015c)). Recent work has taken on the task of alleviating this redundancy. Kaplan (2015c) argues that each constraint type may target only a particular kind of position, so the extent to which they compete for control over positions is reduced. In particular, he argues that whereas positional faithfulness constraints may hold for prominent positions of all types, positional licensing may target only the most prominent positions – primary but not secondary stress, for example. Jesney (2011a,b), on the other hand, speculates that Harmonic Grammar (HG; Legendre, Miyata & Smolensky 1990, Smolensky & Legendre 2006, Pater 2009) may provide an opportunity to eliminate positional faithfulness altogether. As she shows, positional licensing is more powerful in that framework than it is in OT, and it can produce some phenomena in HG that require a positional faithfulness account in OT. Not only would elimination of positional faithfulness solve the overlap problem, but it would also address the incorrect typological predictions made by positional faithfulness that Beckman (1999) and Jesney point out (one of which is summarized in Section 5 below).

In this paper, we explore this intriguing possibility more fully. Our conclusion is that HG cannot dispense with positional faithfulness after all. We present two arguments to this effect. First, Jesney illustrates the extra power that HG grants positional licensing by examining what she calls Licensing in Multiple Contexts (LMC). For example, whereas [ɛ, ɔ] have just one licensing position in Tamil, coronal consonants in the language have two: onsets and initial syllables. Jesney shows that an account of this fact that uses only positional licensing is possible in HG but not in OT. We show that the distributional properties of non-coronals in Tamil are incompatible with the positional-licensing-based LMC analysis, and we argue that this analysis is inconsistent with the typological facts concerning licensing-based processes. Possible repairs exacerbate the typological deficiencies and introduce new drawbacks of their own. In contrast, an account that includes positional faithfulness models Tamil's consonantal system in a transparent and typologically responsible way.

Finally, building on the typological generalizations that inform our first argument, we focus more directly on positional faithfulness's role in governing the directionality of assimilation (what Walker (2011) calls TRIGGER CONTROL). When a constraint compels assimilation between two elements, the grammar must decide which will assimilate to the other. Often, the element in the more prominent position triggers assimilation in the other: codas assimilate to onsets, for example, as we illustrate below with Tamil. A positional faithfulness constraint that holds for the prominent position can produce this state of affairs. Consequently, if we are to eliminate positional faithfulness, other means of trigger control must be

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adopted. We argue that the available replacements sacrifice positional faithfulness's insights and empirical successes.

In short, we argue that, like OT, HG cannot make do with only positional licensing. Positional licensing is indeed more powerful in HG than in OT, but there remain certain phenomena and typological generalizations that require positional faithfulness.

The paper is structured as follows. Section 2 presents the facts of coda place assimilation in Tamil, which constitute the bulk of the empirical basis of our arguments. Section 3 summarizes Beckman's (1999) analysis of Tamil grounded in positional faithfulness, which makes a useful point of comparison for the positional-licensing-based analysis we examine in subsequent sections. Section 4 presents the core of our argument: we summarize the positional licensing approach to Tamil's coronals in Section 4.1 and show why it is inconsistent with non-coronals in Section 4.2. We then present our arguments concerning the typological drawbacks of the positional licensing analysis (Section 4.3), the consequences of the analysis's failure to account for non-coronals (which we argue is best rectified via positional faithfulness; Section 4.4), and positional faithfulness's importance for trigger control (Section 4.5). Section 5 summarizes and concludes the paper.

2. Coda Place Assimilation in Tamil

Our investigation of positional licensing and positional faithfulness is centered on the behavior of various types of codas in Tamil. (For previous analyses, see especially Beckman (1999), which we summarize below. The discussion in this section largely follows Beckman's characterization of the facts.) For this purpose, it is useful to examine coronals and non-coronals separately. Although their distributions are similar, these two kinds of consonants behave differently in one respect that will become crucial in subsequent sections. Christdas (1988: 129) provides the following inventory of surface consonants in Tamil.

(1)

	Lab.	Dental	Alv.	Retro.	Pal.	Post Pal.	Velar	Glot.
Stops	p b	t̪ d̪	t d	ʈ ɖ	c ɟ	k’	k	ʔ
Fricatives	β	ð	s	ʂ		ç	x	
Nasals	m	n̪	n	ɳ	ɲ		ŋ	
Laterals			l	ɭ				
Rhotics			r r̲[3]	ɽ				
Approx.	w ʋ				j			

[3] Christdas (1988: 161) describes /r̲/ as retracted.

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As shown in (2), coronals appear in codas of initial syllables and in onsets (of any syllable).[4] Throughout, in terms of coronals, we focus on alveolar and retroflex consonants. The distributions of palatals and dentals are limited in ways that other coronals (and even other places of articulation) are not (Christdas 1988); they are excluded from codas (except for the nasals, which appear as the product of place assimilation with a following onset), so it is difficult to assess whether they pattern with other coronals, and we set them aside. Weak evidence that palatals can surface in initial-syllable codas comes from examples like [tej.ʋã] 'god' (Christdas 1988: 230), although the glide may be part of a diphthong and not a coda.

(2)	/aarʋam/	aar.ʋã	'eagerness'	(231)
	/naɳpan/	naɳ.bã	'friend'	(234)
	/nakam/	n̪a.xã[5]	'nail'	(147)
	/t̪unpam/	t̪un.bã	'sorrow'	(234)
	/aaʈ/	aa.ɖɯ	'goat'	(141)
	/mun-pakkam/	mun.p̆ak.kã	'the front side'	(156)
	/mun-koopam/	mun.k̆oo.bã	'short-tempered'	(156)

Outside the initial syllable, coda coronals must share place features with a following onset. Nasals in this position undergo assimilation to the adjacent onset, as do laterals if the adjacent onset is coronal. These facts are shown in (3).

(3)	/kaɖan + kaɭ/	ka.ɖʒŋ.gɜ	'debts'	(154)
	/kappal + t̪aan/	kap.pɜl̪.t̪ãã	'ship (EMPH)'	(319)

Coronal obstruents, laterals not followed by coronals, and rhotics do not assimilate. Instead, they trigger epenthesis (4). This epenthesis plays no role in the remainder of the paper; we mention it only for expository completeness. Geminates are also attested ([ji.ɾuʈ.ʈɯ] 'darkness'), although apparently they do not arise via assimilation.

[4] All Tamil data come from Christdas (1988) unless otherwise noted, and numbers in parentheses indicate the page numbers where the data are found. For perspicuity, we have added syllabification marks. We have also modified Christdas's transcriptions by using more standard IPA conventions and by showing the effects of phonological rules that she describes but does not always transcribe (e.g. '[i]n non-initial syllables, /i/ is realized as [ɪ]' (Christdas 1988: 175)).

Christdas (1988: 157) describes the post-nasal consonants in the final two examples of (2) as 'partially voiced'.

[5] According to Christdas (1988: 147), word-final /m/ is deleted in normal speech (and this deletion triggers nasalization of the preceding vowel), but in careful speech it may be retained. We show the normal-speech variant here and in similar examples. Moreover, as is evident in this form, word-initial /n/ regularly becomes dental [n̪] (Christdas 1988: 149).

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(4)	/paṉil + kk/	pa.ṉɪ.lɯk.kɯ	‘answer (DAT)’	(318)
	/kappal + kaɭ/	kap.pɜ.lɯ.xɜ	‘ships’	(318)
	/poṉaɾ + kaɭ/	po.ɖɜ.ɾɯ.xɜ	‘bushes’	(331)
	/ṯamiɻ + kk/	ṯa.mɪ.ɻɯk.kɯ	‘Tamil (DAT)’	(331)

Coronal place features are therefore licensed in two positions: onsets and initial syllables.[6] They appear in other positions, namely non-initial-syllable codas, only by virtue of also having a presence in one of these licensing positions.

Non-coronals in Tamil have a more restricted distribution. Like coronals, non-coronals occur in onsets, as in (5).

(5)	/koopam/	koo.ʋã	‘anger’	(137)
	/ɾompaʋ/	ɾom.bɜ	‘much’	(160)
	/pakkam/	pak.kã	‘side’	(143)

However, non-coronal nasal codas always share place features with a following onset, even in initial syllables.[7] Active assimilation is visible outside the initial syllable:

(6)	/maɾam + kaɭ/	ma.ɾɜŋ.gɜ	‘trees’	(192)
	/maɾam + ṯaan/	ma.ɾɜn̪.d̪ãã	‘tree (EMPH)’	(192)
	/koɭam + ṯooɳʈij/	ko.ɭɜn̪.ṯooɳ.ɖɪ[8]	‘a tool for dredging ponds’	(192)

Assimilation in the initial syllable is evident from the absence of forms like those in (7), in contrast with, say, [ṯun.bã] ‘sorrow.’

(7) *tum.tã
*kaŋ.bɯ
*ŋaʋ.tã

As with coronals, non-coronal obstruents appear in codas only as geminates (e.g. [kap.pɜl.ṯãã] ‘ship (EMPH)’) and trigger epenthesis (8) rather than undergoing assimilation. Again, we set this epenthesis aside for the remainder of the paper.

[6] See Beckman (1999) for an argument that this – rather than ‘onsets and initial-syllable codas’ – is the proper characterization.

[7] An anonymous reviewer points out that the failure of coronals and only coronals to assimilate is inconsistent with common underspecification-related views of coronals as unmarked (e.g. Kiparsky 1982, Borowsky 1986, Archangeli 1988): since unmarked features like [Coronal] are underlyingly unspecified, these segments should be the least resistant to assimilation, not the most. On the other hand, coronals’ resistance follows naturally from feature-specific markedness constraints that penalize marked features more than unmarked features, as in Beckman’s (1999) analysis of Tamil, which we take up in the next section. (For arguments that coronals are unmarked, see Paradis & Pruent (1991).)

[8] Christdas transcribes the [ṯ] in this form as [T]; we are uncertain of this symbol’s meaning, but our use of [ṯ] follows Beckman (1999: 101).

(8) /kaṯap + kaɭ/ ka.ɖ̪ɜ.ʊɯ.xɜ ‘doors’ (306)
/kamp + kk/ kam.bɯk.kɯ ‘stick (DAT)’ (289)

To summarize, outside the initial syllable, codas must share place features with a following onset, and assimilation is one way in which the language enforces this requirement. The same is true for initial-syllable codas, except that coronals are exempt from the place-sharing requirement. Coronal place features, then, are licensed in two contexts, while non-coronal place features are licensed only in onsets. As we will see in Section 4.2, this is the source of the analytical problems for positional licensing: while coronals exhibit an LMC configuration, non-coronals do not, and the distributional overlap between the two kinds of segments makes a positional licensing account untenable, not just in OT but in HG as well.

Before addressing those issues, though, we present Beckman’s (1999) analysis of Tamil, which uses positional faithfulness in OT and makes a useful contrast with the approaches using positional licensing that we focus on below.

3. Positional Faithfulness

The Tamil facts presented above exemplify a common crosslinguistic pattern whereby certain elements must be at least partially realized in particular privileged positions. In the case of Tamil, these positions are onsets for all place features and initial syllables for coronals. See Beckman (1999), Smith (2005), Barnes (2006), Walker (2011), and Kaplan (2015c) for a catalog of privileged positions and the properties that make them privileged.

Tamil’s coronals present a particularly interesting challenge because they exhibit two licensing positions. Beckman’s (1999) positional-faithfulness-based account of these facts, which we will call the PF-OT analysis, works as follows. Assimilation of coronals is driven by *Coronal, which penalizes each instance of the feature [Coronal] (rather than each segment that bears [Coronal], so clusters like [nd] that share a [Coronal] feature incur just one violation). This outranks Ident(Place) and compels place assimilation as a means of reducing the number of [Coronal] features in a form. However, *Coronal is dominated by Ident(Place)-Onset and Ident(Place)-σ_1, positional faithfulness constraints that preserve coronals in onsets and initial syllables, respectively. The analysis is illustrated in (9). In (9a), both /ɖ̪/ and /n/ violate *Coronal. The former is preserved by Ident(Place)-Onset, but elimination of the latter’s [Coronal] feature (via place assimilation) violates neither positional faithfulness constraint. Moreover, in (9b), both coronals are protected by Ident(Place)-σ_1. ([t̪] is also protected by Ident(Place)-Onset.)

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(9) (a)

/kaɖan + kaɭ/	IDENT(Place)-Ons	IDENT(Place)-σ_1	*COR	IDENT(Place)
a. ka.ɖan.gɜ			**!	
☞ b. ka.ɖɜŋ.gɜ			*	*
c. ka.ʔɜŋ.gɜ	*!			**

(b)

/t̪unpam/	IDENT(Place)-Ons	IDENT(Place)-σ_1	*COR	IDENT(Place)
☞ a. t̪un.bã			**	
b. t̪um.bã		*!	*	*
c. ʔun.bã	*!	*!	*	*

Turning to non-coronals, since these consonants are preserved in onsets, IDENT(Place)-Onset outranks *DORSAL and *LABIAL. However, because non-coronals undergo assimilation in initial-syllable codas, *DORSAL and *LABIAL outrank IDENT(Place)-σ_1. The resulting ranking is shown in (10). As (10a) and (10b) show, the markedness constraints compel assimilation between codas and onsets, with IDENT(Place)-Onset ensuring regressive assimilation. Moreover, as (10c) shows, IDENT(Place)-σ_1 cannot block assimilation of initial-syllable non-coronals. ((10c) uses a hypothetical input that maps to [paŋ.gɯ] 'share.')

(10) (a)

/maɾam + kaɭ/	IDENT-Onset	*DOR	*LAB	IDENT-σ_1	*COR	IDENT
a. ma.ɾɜm.gɜ		*	**!		*	
☞ b. ma.ɾɜŋ.gɜ		*	*		*	*
c. ma.ɾɜm.bɜ	*!		**		*	*

(b)

/kaɖan + kaɭ/	IDENT-Onset	*DOR	*LAB	IDENT-σ_1	*COR	IDENT
a. ka.ɖan.gɜ		**			**!	
☞ b. ka.ɖɜŋ.gɜ		**			*	*
c. ka.ɖɜn.dɜ	*!	*			**	*

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(c)

/pamk/	IDENT-Onset	*DOR	*LAB	IDENT-σ_1	*COR	IDENT
a. pam.gɯ		*	**!			
☞ b. paŋ.gɯ		*	*	*		*
c. pam.bɯ	*!		**			*

The crucial players in this system, in terms of defining the positions where consonants may appear, are the two positional faithfulness constraints. *DORSAL, *LABIAL, and *CORONAL provide the motivation for assimilation, but their effect is indiscriminate (without positional faithfulness to rein them in). The distributional generalizations of the consonants in question are captured by the two positional faithfulness constraints and their ranking with respect to markedness constraints.

In sum, then, the PF-OT analysis efficiently captures the facts of Tamil by positing two positional faithfulness constraints, each of which protects some or all consonants by outranking markedness constraints that would eliminate those consonants. We turn now to positional-licensing-based analyses of Tamil.

4. POSITIONAL LICENSING

4.1 *Coronals*

Jesney (2011b) argues that even though positional licensing and positional faithfulness cover much of the same ground (as discussed above in the context of Tamil's mid vowels), a positional-licensing-based account of Tamil's coronals is not possible in OT. The reason is directly attributable to the LMC distribution of coronals. We adopt here the formalism developed by Walker (2011), in which positional licensing constraints take the form LICENSE(λ, π); λ is the feature or combination of features subject to the positional restriction and π is the licensing position – the position in which λ must be realized. Formally, LICENSE(λ, π) requires λ to coincide with π, where 'coincidence' (Zoll 1998) essentially means, for our purposes, that λ and π must at least partially overlap.

The two positional licensing constraints in (11) capture the fact that in Tamil, coronal place features must appear either in onsets (LICENSE(Place, Onset)) or in initial syllables (LICENSE(Coronal, σ_1)).

(11) (a) LICENSE(Place, Onset): each place feature must coincide with an onset segment.
(b) LICENSE(Coronal, σ_1): each coronal place feature must coincide with the initial syllable.

If these constraints are to have any effect on consonants, they must outrank the relevant faithfulness constraints, in particular IDENT(Place). However, this results

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in coronals surfacing only in the onset of the initial syllable because only there do they satisfy both licensing constraints. The problem is illustrated in (12). (Here, (☞) and 💣 mark the intended output and incorrect winner, respectively.) The inputs in (12a) and (12b) contain a coronal that violates one positional licensing constraint (/n/ and /ʈ/, respectively), and because each of these constraints outranks faithfulness, it compels some sort of repair, such as assimilation or feature deletion. Only in (12c), where the coronal occurs in the onset of the initial syllable and therefore violates neither constraint, is the correct outcome produced.

(12) (a)

/t̪unpam/	Lic(Place, Onset)	Lic(Coronal, σ_1)	Ident(Place)
(☞) a. t̪un.bã	*!		
💣 b. t̪um.bã			*

(b)

/kaʈan/	Lic(Place, Onset)	Lic(Coronal, σ_1)	Ident(Place)
(☞) a. ka.ɖẽ		*!	
💣 b. ka.ʔẽ			*

(c)

/nakam/	Lic(Place, Onset)	Lic(Coronal, σ_1)	Ident(Place)
☞ a. n̪a.xã			
b. ʔa.xã			*!

The problem, as Jesney explains, is that the use of two positional licensing constraints in OT yields a system in which [Coronal] is permitted at the intersection of the two licensing positions – onsets of initial syllables – rather than their union. This is because License(λ, π) requires rather than permits λ to coincide with π. Consequently, coronals surface only where they satisfy both constraints, when the intended outcome is that they surface where they satisfy at least one of them. (Compare this with the PF-OT analysis, where Ident(Place)-Onset, e.g., protects onsets but says nothing about other positions.) An OT analysis based solely on two positional licensing constraints fails.[9]

[9] It is conceivable to reimagine positional licensing altogether. For example, a disjunctive approach to licensing, where, say, License(Coronal, onset/σ_1) is satisfied by coronals either in onsets or in initial syllables, would produce LMC. However, we are aware of no proposals of this sort in the literature, and such a view of positional licensing would deviate greatly from the usual conception of this constraint type. Furthermore, such revisions do not affect Jesney's insight, which is that HG can produce LMC with standard positional licensing while OT cannot.

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As Jesney shows, shifting the analysis to HG resolves this conundrum. Harmonic Grammar, which assigns weights to constraints instead of ranking them, allows gang effects (Pater 2009), whereby multiple violations of lower-weighted constraints can constitute a greater penalty than a single violation of a higher-weighted constraint. The positional licensing analysis of LMC exploits this property. The appropriate weighting conditions are given in (13). If IDENT has a greater weight than either licensing constraint (13a), a violation of just one licensing constraint cannot trigger unfaithfulness as it did in (12). However, if the sum of the weights of the two licensing constraints is greater than that of IDENT (13b), violation of both licensing constraints at once is worse than one violation of IDENT, and unfaithfulness will be triggered in that situation.

(13) (a) w(IDENT(Place)) > w(LICENSE(Place, Onset)), w(LICENSE(Coronal, σ_1))
(b) w(IDENT(Place)) < w(LICENSE(Place, Onset)) + w(LICENSE(Coronal, σ_1))

The analysis is illustrated in (14). The [n] in candidate (a) in (14a) violates LICENSE(Place, Onset). Elimination of this violation, as in candidate (b), introduces a violation of IDENT(Place); since IDENT(Place) has a greater weight than LICENSE(Place, Onset), this repair leads to a worse score, and the faithful candidate wins. The same goes for (14b), except that this time the winning candidate violates LICENSE(Coronal, σ_1). However, in (14c), the faithful candidate's [n] violates both licensing constraints;[10] these two violations are worse than candidate (b)'s one violation of IDENT(Place), and assimilation occurs. Of course, coronals violating neither licensing constraint emerge faithfully (14d). (This form illustrates a regular process whereby alveolar /n/ becomes dental word-initially; see footnote 4.)

(14) (a)

/t̪unpam/	IDENT(Place) 3	LIC(Place, Onset) 2	LIC(Coronal, σ_1) 2	H
☞ a. t̪un.bã		−1		−2
b. t̪um.bã	−1			−3

(b)

/kaʈan/	IDENT(Place) 3	LIC(Place, Onset) 2	LIC(Coronal, σ_1) 2	H
☞ a. ka.ɖẽ			−1	−2
b. ka.ʔẽ	−1			−3

[10] Here and elsewhere, we adopt the practice of indicating in tableaux which segments incur particular violations where such clarification seems to be warranted. We consider progressive assimilation, which would also satisfy the licensing constraints, in Section 4.5.

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(c)

/kaɖan + kaḷ/	Ident(Place) 3	Lic(Place, Onset) 2	Lic(Coronal, σ_1) 2	*H*
a. ka.ɖan.gɜ		−1(n)	−2(ɖ, n)	−6
☞ b. ka.ɖʒŋ.gɜ	−1(ŋ)		−1(ɖ)	−5

(d)

/nakam/	Ident(Place) 3	Lic(Place, Onset) 2	Lic(Coronal, σ_1) 2	*H*
☞ a. n̪a.xã				0
b. ʔa.xã	−1			−3

In this system, which we will call the PL-HG analysis, the two positional licensing constraints can gang up on Ident, while Ident prevents either licensing constraint from triggering unfaithfulness on its own. This is impossible in OT, where no number of violations of lower-ranked constraints can overcome a violation of a higher-ranked constraint; hence the need to rank both licensing constraints over Ident, which leaves nothing to hold those constraints in check. To put it differently, HG supports a configuration in which trading one violation of a licensing constraint for one violation of Ident is not fruitful (as in (14a) and (14b)), but trading two licensing violations for one Ident violation is (as in (14c)).

The larger consequence is that only HG supports a positional-licensing-only analysis of LMC patterns (setting aside the question of how to derive the correct direction of assimilation, which we take up in Section 4.5). Perhaps, then, HG grants positional licensing the power to take over all of positional faithfulness's duties. This would be a significant result for reasons stated above: positional licensing and positional faithfulness overlap in their empirical coverage, and positional faithfulness invites certain pathologies. However, as attractive as this possibility is, we argue that positional faithfulness remains a necessary part of CON. Interestingly, this is revealed by expanding the PL-HG analysis to account for Tamil's non-coronals.

4.2 *Non-Coronals*

The PL-HG analysis accounts for coronals in Tamil and reveals important differences between OT and HG. However, as we will see in this section, the analysis is incompatible with the behavior of non-coronals in Tamil.

We recall that non-coronal nasals undergo coda place assimilation in all syllables, including initial syllables. Relevant examples from Section 2 are repeated below. Active assimilation in non-initial syllables is observable in (15), and unassimilated initial-syllable codas like those in (16b), in contrast to (16a), are unattested.

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(15)

/maram + kaɭ/	ma.ɾɜŋ.gɜ	‘trees’	(192)
/maram + t̪aan/	ma.ɾɜn̪.d̪ãã	‘tree (EMPH)’	(192)
/koɭam + t̪ooɳʈij/	ko.ɭɜn̪.t̪ooɳ.dɪ	‘a tool for dredging ponds’	(192)

(16)

(a)	/ɾompaʊ/	ɾom.bɜ	‘much’	(160)
	/paŋk/	paŋ.gɯ	‘share’	(192)
	/kamp/	kam.bɯ	‘stick’	(192)
(b)	*tum.tã			
	*kaŋ.bɯ			
	*n̪aʊ.tã			

What drives assimilation of non-coronals? The PL-HG analysis already includes LICENSE(Place, Onset), which requires all place features to have membership in an onset position. This is exactly what we need to account for non-coronals, but as (17) shows, the PL-HG analysis predicts that these consonants will not assimilate. The illicit coda [m] in candidate (a) violates only LICENSE(Place, Onset) for a penalty of −2. The intended winner, with place assimilation, violates IDENT(Place) and incurs a penalty of −3. Addition of the −2 penalty for [ɾ] shared by the candidates gives the results shown here: assimilation is less advantageous than faithfulness.

(17)

/maram + kaɭ/	IDENT(Place) 3	LIC(Place, Onset) 2	LIC(Coronal, σ_1) 2	H
a. ma.ɾɜm.gɜ		−1(m)	−1(ɾ)	−4
(☞) b. ma.ɾɜŋ.gɜ	−1(ŋ)		−1(ɾ)	−5

By design of the analysis, LICENSE(Place, Onset) cannot trigger assimilation on its own. It can only do so when failure to assimilate also violates LICENSE(Coronal, σ_1) – this property is the crux of the PL-HG approach to LMC. However, LICENSE(Coronal, σ_1) is irrelevant here because the coda consonant is not a coronal.

We can see here that the positional-licensing-based approach to LMC predicts that the two markedness constraints responsible for the LMC pattern should be inactive outside the LMC context. Except where the two constraints reinforce each other by ganging up on faithfulness, they are inert. There may be LMC patterns that bear out this prediction, but Tamil’s is not one of them, and therefore a full account of Tamil cannot stand on the PL-HG approach to LMC alone.

The failure of (17) reveals a weighting contradiction. The PL-HG analysis requires w(IDENT) > w(LICENSE(Place, Onset)), but non-coronals require w(LICENSE(Place, Onset)) > w(IDENT). Since we cannot have both situations at once, the current constraint inventory is inadequate. We explore ways of amending the analysis in Section 4.4, but first we discuss the crosslinguistic typology of licensing-based systems. This typology provides a basis for evaluating the

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remedies discussed in Section 4.4 and sheds light on the PL-HG analysis as it currently stands.

4.3 *Typology*

Positional licensing requires elements to appear in a designated prominent position but does not dictate how that configuration is to be achieved. Consequently, it motivates a variety of processes that fall into two broad categories (Kaplan 2015c). In the first, which Kaplan calls PRESERVATION, the restricted element survives faithfully in the licensing position but is neutralized elsewhere. This neutralization can take the form of eradication (the restricted feature does not appear outside the licensing position at all, as is the case with Tamil's mid vowels; see Section 1) or harmony (e.g. other positions may host the restricted feature only by assimilating to the licensing position). Tamil's consonantal distribution reflects the 'harmony' subtype: place features are permitted in codas only when those features are shared by a following onset (except, of course, that coronals may surface in initial-syllable codas). Both positional licensing and positional faithfulness produce preservation: the former militates against elements outside the licensing position and the latter targets the licensing position for faithfulness.

The second kind of process is what Kaplan calls OVERWRITE. Here, the restricted feature moves or spreads to the licensing position, replacing that position's underlying features. Only positional licensing can motivate overwrite: assimilation within the licensing position is incompatible with positional faithfulness. Overwrite systems are found, among other places, in the metaphony patterns of Romance languages. For example, in the variety spoken in Central Veneto, post-tonic high vowels trigger raising of the stressed vowel (Walker 2005, 2008, 2010, 2011). Representative examples are shown in (18). The final example shows that metaphony does not require the trigger and target to be adjacent; at longer distances, intervening vowels also raise.[11]

(18)

kals-ét-o	'sock (M, SG)'	kals-ít-i	'sock (M, PL)'
kant-é-se	'sing (1PL)'	kant-í-si-mo	'sing (1PL, IMP, SBJV)'
móv-o	'move (1SG)'	múv-i	'move (2SG)'
kantór	'choir singer (M, SG)'	kantúr-i	'choir singer (M, PL)'
órdeno	'order (1SG)'	úrdini	'order (2SG)'

Walker (2011) attributes Central Veneto's metaphony to LICENSE([+hi]/$\sigma_{\text{post-tonic}}$, $\acute{\sigma}$), which requires post-tonic [+high] to coincide with the stressed syllable.

[11] Only /e/ and /o/ raise: [gát-i] 'cat (M, PL),' [vɛ́tʃ-i] 'old man (M, PL),' [tɔ́k-i] 'piece (M, PL).' Moreover, [a] blocks metaphony when it appears between the trigger and target: [la(v)ór̲-a-v-i] 'work (2 SG, PERF, IND).' We mention these facts for empirical completeness; they do not bear on the argument made here.

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Kaplan identifies an asymmetry between preservation and overwrite: while the former seems to be able to target any prominent position, the latter is confined to targeting what Kaplan calls MAXIMALLY PROMINENT positions – those that are most prominent along some dimension. For example, overwrite can target primary stress (as illustrated by Central Veneto), but there are no systems in which it targets secondary stress. However, non-maximally prominent positions can exhibit preservation: English vowel reduction, e.g., is blocked by secondary stress.

On the basis of this asymmetry, Kaplan argues that positional licensing may designate only maximally prominent positions as licensors. With positional licensing unable to target secondary stress, overwrite for that position is impossible. However, because positional faithfulness is not limited to maximally prominent positions, preservation in non-maximally prominent positions can still be obtained. We note in passing that this line of reasoning indicates that positional faithfulness is central to the account of the typology of licensing-based vocalic phenomena, and therefore any attempt to discard positional faithfulness in HG by using positional licensing to produce preservation sacrifices the account of the preservation/overwrite asymmetry. If positional licensing must produce preservation in non-maximally prominent positions, it will also permit overwrite.

As for our more immediate concerns regarding Tamil, Kaplan's argument is relevant here because consonantal systems exhibit a similar typological asymmetry. In particular, there seem to be no overwrite patterns in consonant harmony at all (Hansson 2001).[12] Hansson is most explicit on this point regarding prosody: '[p]rosody-sensitivity is entirely UNATTESTED in the typology of consonant harmony systems' (244; emphasis original), but he makes the same point for other kinds of prominence, too. For example, he argues that all consonant harmony systems are either regressive or stem-controlled; none specifically target stems, onsets, or initial syllables. Apparent exceptions to this generalization in the realm of place assimilation (for voice assimilation, see Section 4.5) exist only, to the best of our knowledge, at particular morphological boundaries or when apicals interact with each other, but in neither case does assimilation actually seek out these positions – the fact that onsets, e.g., assimilate is coincidental. First, suffix-initial consonants may assimilate to root-final consonants (Beckman 1999, McCarthy 2008). Ibibio (Akinlabi & Urua 2003) exemplifies this arrangement. In (19), the initial consonant of the negation suffix assimilates to the root-final consonant.

[12] An anonymous reviewer suggests that the rarity of consonant harmony compared with vowel harmony may be responsible for this gap. This is certainly plausible, although we do not think that consonant harmony is rare enough to make it the most likely explanation. For example, Hansson's (2001) typologically and genetically diverse survey of consonant harmony includes 'nearly 100 separate cases' (Hansson 2001: 41), none of which show overwrite. At the very least, this indicates a bias toward preservation if not the outright impossibility of overwrite. The two kinds of systems are not on an equal footing, as implied by positional licensing's ability to produce both.

(19)

dép	'buy'	ɨ́-dép-pé	'he is not buying'
bót	'mold'	ɨ́-bót-tó	'he is not molding'
ɲèk	'shake'	ɨ́-ɲèk-ké	'he is not shaking'
dóm	'bite'	ń-dóm-mó	'I am not biting'
sàŋ	'go'	ń-sàŋ-ŋà	'I am not going'

These examples reflect root faithfulness: whereas IDENT(Place)-Onset is responsible for trigger control in Tamil, IDENT(Place)-Root is active here.[13] Therefore, properly understood, this is not an overwrite system that targets onsets; it is a preservation system wherein the element undergoing assimilation happens to fall in a position that belongs to the set of potential licensors.

As for apicals, Steriade (2001) argues that unlike most other consonants, contrasts among apicals are better signaled in VC transitions than in CV transitions. Clusters of apicals consequently show reversals of the usual directionality facts and assimilate progressively. We therefore require other constraints that reflect their peculiar situation. As with Ibibio, then, this is not an overwrite system targeting onsets. Rather, progressive assimilation is enforced by constraints sensitive to cue robustness and oblivious to syllabification, as Steriade proposes.

The behavior of apicals and Ibibio's consonants is in sharp contrast to (nonexistent) true overwrite systems, in which assimilation invariably targets onsets precisely because they are onsets in exactly the way that metaphony singles out stressed syllables for assimilation in Central Veneto. Positional licensing predicts Central Veneto's harmony, and, if constraints like LICENSE(Place, Onset) and LICENSE(Coronal, σ_1) are permitted, it predicts analogous systems for consonants. The PL-HG analysis uses these constraints to achieve a preservation system in Tamil: given a hypothetical input like /kanpan/, LICENSE(Coronal, σ_1) leaves the leftmost nasal untouched while eliminating the second one. However, it also predicts the corresponding unattested overwrite system, in which an unlicensed [Coronal] feature spreads to the first syllable (and exclusively the first syllable; this is not one of Hansson's characteristically regressive systems): e.g. /ka.pan/ → [ta.pan] or [kan.pan].

These incorrect predictions are a consequence of permitting positional licensing to manipulate consonantal features. Positional licensing alone produces overwrite, and this is the kind of consonantal pattern that we do not find. Building on the reasoning developed by Kaplan (2015c), this typological contrast suggests that positional licensing is an inappropriate tool for analysis of consonantal systems. Therefore, even if the shortcomings of the PL-HG analysis concerning noncoronals could be addressed using only positional licensing (and we argue in Section 4.4 that the potential repairs only introduce new problems), that analysis would have to be rejected on typological grounds.

[13] Beckman (1999) argues that Ibibio actually shows the effect of faithfulness to the root's initial syllable rather than faithfulness to the entire root. The distinction does not affect the current point.

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On the other hand, the PF-OT analysis does not predict consonantal overwrite, even when imported to HG. IDENT(Place)-Onset and IDENT(Place)-σ_1 predict only preservation systems in onsets and initial syllables, respectively. This contrast provides evidence for positional-faithfulness-based analyses of Tamil over the PL-HG analysis.

To summarize, the crosslinguistic inventory of licensing-based consonantal phenomena is impoverished compared with vocalic phenomena, and the unattested patterns – overwrite systems – are just those that are produced only by positional licensing. This implies that positional licensing should be prohibited from manipulating consonantal features. Consequently, positional faithfulness must be responsible for the consonantal preservation systems that Tamil and other languages exhibit.

Taken together with Kaplan's proposal that positional licensing is restricted to only maximally prominent positions, our claim that only positional faithfulness can manipulate consonantal features leaves little territory for positional licensing to operate in. However, this diminished role for positional licensing is demanded by the typological facts: overwrite systems appear to target only maximally prominent positions and involve only vocalic features. Since positional licensing is responsible for overwrite, it must not have access to other positions and features.

Curtailment of the territory that positional licensing may cover serves several goals. Most immediately, we bring the theory into closer alignment with the facts by ruling out overwrite for non-maximally prominent positions and consonants. Furthermore, we move closer to eliminating the redundancy that goes with adopting both positional licensing and positional faithfulness because there is now less territory in which the two constraint families overlap. Retaining positional faithfulness in HG, then, does not entail accepting that redundancy; there are other ways to ameliorate it besides discarding positional faithfulness.

LICENSE(Coronal, σ_1) is problematic for another reason. Walker (2011) argues, based on the typology of licensing-driven vocalic phenomena, that positional licensing constraints cannot target unmarked features to the exclusion of marked features. Unmarked features never seem to have a more restricted distribution than their marked counterparts. Consequently, LICENSE(Coronal, σ_1), which targets unmarked place features, is illicit: it predict languages in which coronals are confined to onsets while other consonants are not so restricted. Such a pattern is unattested, to the best of our knowledge. In addition, the facts of Tamil are consistent with Walker's typological generalization: unmarked coronals have a greater distribution than dorsals and labials, as we have seen. The data, therefore, do not warrant departure from Walker's restriction. The PL-HG analysis is therefore unsound both because it uses constraints that incorrectly predict consonantal overwrite systems and because one of those constraints imposes a licensing requirement on unmarked features.

An anonymous reviewer rightly points out that the typological considerations that inform the forgoing discussion are formalized by Walker (2011) and Kaplan (2015c) in OT, and we might expect them to be realized in HG in different

ways, particularly since positional licensing is more powerful in HG than in OT. However, whatever the differences between OT and HG, the fact remains that positional licensing produces overwrite systems, and the lack of overwrite involving non-maximally prominent positions and consonants means that positional licensing constraints for those elements must be excluded. Likewise, a constraint like LICENSE(Coronal, σ_1) is illicit in both OT and HG because in both frameworks it singles out unmarked place features. Whatever form positional licensing must take in HG (see Kaplan (2015a,b, to appear) for an argument that it must be quite different formally from its OT counterpart), it must still be prohibited from producing unattested overwrite, and it must not single out unmarked features.

To conclude this section, whether or not the LMC schema can adequately model Tamil, there are various typological considerations that such an analysis must be mindful of. Positional licensing may be inappropriate for consonantal systems in general, and the licensing constraints adopted for LMC systems must not restrict unmarked features specifically. There are thus two hurdles for the PL-HG analysis to overcome – the incorrect predictions regarding non-coronals and the typological drawbacks discussed here – and in the next section we argue that addressing the first introduces new problems and only exacerbates the second. We will add a third hurdle, trigger control, in Section 4.5.

4.4 *PL-HG revisited*

As illustrated in (17), the PL-HG analysis fails to produce assimilation of non-coronal codas because the assimilation-driving constraint, LICENSE(Place, Onset), is outweighed by faithfulness and therefore cannot trigger assimilation on its own. A contradiction emerges: LICENSE(Place, Onset) must outweigh faithfulness to deal with non-coronals, but coronals' LMC behavior requires the opposite relationship. There are three broad routes available for correcting the problem: (i) adopt the weights required for non-coronals and add more constraints to deal with the LMC facts; (ii) adopt the LMC weights and incorporate more constraints to account for non-coronals; (iii) reformulate the existing constraints so that the contradiction does not arise. In this section, we consider each of these approaches in turn.

4.4.1 *Using the weights required for non-coronals*

If LICENSE(Place, Onset) is to trigger assimilation for non-coronals, its weight must be greater than IDENT's. Under this configuration, LICENSE(Place, Onset) motivates assimilation in all codas. This produces the correct result for non-coronals (20a) and coronals outside the initial syllable (20b).

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(20) (a)

/maɾam + kaɭ/	Lic(Place, Onset) 3	Ident(Place) 2	*H*
a. ma.ɾɜm.gɜ	–1		–3
☞ b. ma.ɾɜŋ.gɜ		–1	–2

(b)

/kaɖan + kaɭ/	Lic(Place, Onset) 3	Ident(Place) 2	*H*
a. ka.ɖan.gɜ	–1		–3
☞ b. ka.ɖɜŋ.gɜ		–1	–2

However, the analysis obviously overgenerates, predicting assimilation of initial-syllable coronals:

(21)

/t̪unpam/	Lic(Place, Onset) 3	Ident(Place) 2	*H*
(☞) a. t̪un.bã	–1		–3
💣 b. t̪um.bã		–1	–2

We need to rein in the power of License(Place, Onset) in this context, and our claim is that this must come in the form of positional faithfulness. The reason is simple. The generalization to be captured is tailor-made for this constraint type: a specific prominent position exhibits greater faithfulness in the form of resistance to an otherwise general process. Addition of a constraint that requires faithfulness to [Coronal] in the initial syllable gives the correct result, as in (22).

(22)

/t̪unpam/	Ident(Cor)-σ_1 4	Lic(Place, Onset) 3	Ident(Place) 2	*H*
☞ a. t̪un.bã		–1		–3
b. t̪um.bã	–1		–1	–6

This analysis accounts for the full range of facts. Ident(Cor)-σ_1 has no impact on (20a) because coronals are not involved in the assimilation seen there. Likewise, (20b) is unaffected because the assimilating coronal is outside the initial syllable. Moreover, we are in the fortuitous position of no longer requiring the typologically suspect License(Coronal, σ_1): the generalization captured by this constraint is now captured by Ident(Cor)-σ_1. If we are correct that consonants are out of bounds for positional licensing, the PF-OT analysis

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remains superior on typological grounds, but at least now the PL-HG analysis successfully models Tamil and avoids the imposition of a licensing requirement on unmarked features. Moreover, the transparency of the PL-HG and PF-OT analyses is preserved: the general tendency of codas to assimilate is captured by LICENSE(Place, Onset), and coronals' special behavior is formalized in IDENT(Cor)-σ_1. A single positional faithfulness constraint is sufficient to resolve the weighting contradiction that plagues the PL-HG analysis and to begin to address the typological deficiencies of the positional licensing constraints.

4.4.2 *Maintaining the LMC weights*

If we are to keep the LMC weights intact, we must introduce constraints that motivate non-coronal assimilation. We consider a variety of possibilities in this section. Under the PL-HG analysis, coronals assimilate when they violate two licensing constraints. Taking a cue from this arrangement, non-coronals can be accommodated by adding a third licensing constraint, one that unassimilated non-coronal codas violate (and unassimilated coronals do not) in addition to LICENSE(Place, Onset), so that the gang effect that operates on coronals is reproduced for non-coronals. This is illustrated schematically in (23).

(23)

/maram + kal/	$\underset{3}{\text{ID}}$(Pl)	$\underset{2}{\text{LIC}}$(Pl, Ons)	$\underset{2}{\text{LIC}}$(?, ?)	$\underset{2}{\text{LIC}}$(Cor, σ_1)	*H*
a. ma.ɾɜm.gɜ		−1(m)	−1(m)	−1(ɾ)	−6
☞ b. ma.ɾɜŋ.gɜ	−1(ŋ)			−1(ɾ)	−5

We use question marks in the arguments of the new licensing constraint because the details of this constraint are unclear: what exactly should it penalize? Perhaps, instead of requiring licensing for all place features as LICENSE(Place, Onset) does, it could hold specifically for non-coronals or even just labials. However, this merely recapitulates the force of LICENSE(Place, Onset): we now have two constraints that do effectively the same thing, and the purpose of this is simply to get around the fact that IDENT(Place) outweighs LICENSE(Place, Onset) – we capture nothing new with the new constraint. To put it differently, non-coronals have just one licensing position. A second licensing constraint for non-coronals corresponds to no second licensing position for these segments. This is in contrast to coronals: the fact that they have two licensing positions justifies the inclusion of two licensing constraints for that segment type.

This issue signals a deficiency in the analysis. One of the attractions of the LMC analysis is that it transparently reflects the empirical situation in Tamil, with each licensing position represented by a single licensing constraint. (The PF-OT analysis similarly uses one faithfulness constraint per licensing position.) With the duplication of LICENSE(Place, Onset), this elegance is lost, and enforcement of a single licensing generalization (non-coronals appear in onsets) requires two

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licensing constraints. The pattern no longer falls out from the interaction of independently motivated constraints. Rather, the new licensing constraint's only role in the analysis is to give LICENSE(Place, Onset) a boost when non-coronals are involved. We are covertly increasing LICENSE(Place, Onset)'s weight where necessary, not capturing any new insight.

A related approach involves dividing LICENSE(Place, Onset) into two constraints, LICENSE(Coronal, Onset) and LICENSE(Non-Coronal, Onset). This analysis is illustrated in (24).

(24)

/maɾam + kal/	LIC(Non-Cor, Ons) 4	ID(Pl) 3	LIC(Cor, Ons) 2	LIC(Cor, σ_1) 2	*H*
a. ma.ɾɜm.gɜ	−1(m)			−1(ɾ)	−6
☞ b. ma.ɾɜŋ.gɜ		−1(ŋ)		−1(ɾ)	−5

Under this configuration, LICENSE(Coronal, Onset) participates in the LMC analysis, ganging up on IDENT with LICENSE(Coronal, σ_1). However, since non-coronals fall outside the purview of this constraint, we can adopt the licensing constraint for non-coronals without the redundancy inherent in the analysis in (23). However, it shares with that analysis the property of dividing a unitary licensing process between two different licensing constraints, this time losing the connection between non-coronal and coronal place assimilation. Coronals are no longer part of a broader system of place-feature licensing, and the fact that they share a licensing position with non-coronals is relegated to mere happenstance: there is no theory-internal reason why the coronal and non-coronal licensing constraints must use the same licensing position.

Division of labor of this sort – calling on two smaller constraints instead of one monolithic constraint – has a long history in constraint-based phonology and can be advantageous. To name just one example, Beckman's (1999) analysis of Tamil uses *DOR, *LAB, and *COR instead of *PLACE. However, this technique is inappropriate here because it invites proliferation of the typologically suspect positional licensing constraints that restrict unmarked segments like coronals – in fact, there are two such constraints in (24), yet the facts of Tamil remain consistent with the crosslinguistic generalizations that give rise to Walker's (2011) prohibition on such constraints. In short, there are both conceptual and typological reasons to reject this analysis.

An anonymous reviewer suggests augmentation of the original LMC analysis with an AGREE(Place) (Baković 1999, 2000; Lombardi 1999) constraint (requiring adjacent consonants to share or have identical place features) that can gang up on IDENT with the licensing constraints. However, as the reviewer also points out, this alone cannot solve the current problem. For example, if AGREE(Place) and LICENSE(Place, Onset) combine to trigger assimilation in [ma.ɾɜŋ.gɜ] (25a), they will do the same for initial-syllable coronals (25b).

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(25) (a)

/maɾam + kaɭ/	Ident(Place) 3	Lic(Place, Onset) 2	Agree(Place) 2	*H*
a. ma.ɾ3m.g3		–1(m)	–1(mg)	–4
☞ b. ma.ɾ3ŋ.g3	–1(ŋ)			–3

(b)

/t̪unpam/	Ident(Place) 3	Lic(Place, Onset) 2	Agree(Place) 2	*H*
(☞) a. t̪un.bã		–1(n)	–1(np)	–4
💣 b. t̪um.bã	–1(m)			–3

The incorrect outcome in (25b) can be avoided if Agree(Place) holds only for non-coronals. This new constraint looks suspiciously like License(Non-Coronal, Onset); in fact, resorting to Agree constraints only disguises the redundancy of the licensing-based possibilities explored immediately above. In addition, de Lacy (2002) shows that this sort of feature-specific Agree(Place) constraint cannot account for the full typology of consonantal place agreement systems. The gist of his argument is that in Attic Greek, the first member of a heterorganic CC stop cluster is deleted (e.g. /RED+anut+k+a/ → [ɛːnuka] 'I have accomplished' (Steriade 1982: 217)) unless the second member of the cluster is a coronal (/diɔːk+tɛːn/ → [diɔːktɛːn] 'persecutor (acc, m, sg)'). Agree(dorsal) does not distinguish /kt/ from /tk/ (nor do Agree(coronal) or Agree(Place), for that matter) and therefore predicts that the two kinds of clusters behave identically. De Lacy instead proposes a family of markedness constraints that forbid particular sequences of place features: *{KPT}{KP} bans a (non-homorganic) sequence of a dorsal, labial, or coronal followed by a dorsal or labial and thus accounts for Attic Greek. For Tamil, we would replace Agree(Place) with *{KP}{KPT}, which bans a dorsal or a labial followed by a consonant with different place features. Again, this new constraint merely introduces the redundancy of License(Non-Coronal, Onset) in a different guise. The analysis now presents two reasons for codas to undergo place assimilation – a requirement that place features appear in onsets and a ban on certain heteroganic clusters. While both imperatives are sound on their own, there is no evidence from Tamil that both are active. As before, a new constraint is introduced to effectively increase the weight of positional licensing where needed, not because it captures any new property of the language.

Finally, we arrive at the question of trigger control, which we take up from a crosslinguistic perspective in Section 4.5. The analyses considered in this section motivate place assimilation, but they do not specify the direction of assimilation. This can be seen by adding a candidate with progressive assimilation to (24):

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(26)

/maɾam + kal/	Lic(Non-Cor, Ons) 4	Id(Pl) 3	Lic(Cor, Ons) 2	Lic(Cor, σ_1) 2	*H*
a. ma.ɾ3m.g3	−1(m)			−1(ɾ)	−6
☞ b. ma.ɾ3ŋ.g3		−1(ŋ)		−1(ɾ)	−5
☞ c. ma.ɾ3m.b3		−1(b)		−1(ɾ)	−5

Similar tableaux can be constructed for the other analyses considered immediately above and the original PL-HG analysis. Both progressive and regressive assimilation satisfy LICENSE(Non-Coronal, Onset); an additional constraint is necessary to choose the latter over the former. In Section 4.5, we argue that positional faithfulness is a vital tool for controlling the directionality of assimilation, but we bring up the issue here simply to point out that if one concludes that the conceptual flaws that the foregoing analyses have are a small price to pay for avoiding positional faithfulness, this empirical problem remains.

4.4.3 *Context-Free Markedness*

As an alternative to the new licensing and AGREE-style constraints just considered, we can adopt the context-free markedness constraints from the PF-OT analysis. This approach is illustrated in (27). Just as LICENSE(Place, Onset) and LICENSE(Coronal, σ_1) combine to trigger assimilation of coronals, LICENSE(Place, Onset) and *LABIAL together force assimilation of the coda [m] here.

(27)

/maɾam + kal/	Id(Pl) 3	Lic(Pl, Ons) 2	Lic(Cor, σ_1) 2	*Lab 2	*Dor 1	*H*
a. ma.ɾ3m.g3		−1(m)	−1(ɾ)	−2(m,m)	−1(g)	−9
☞ b. ma.ɾ3ŋ.g3	−1(ŋ)		−1(ɾ)	−1(m)	−1(ŋg)	−8
c. ma.ɾ3m.b3	−1(b)		−1(ɾ)	−2(m,mb)		−9

While this approach uses well-motivated constraints and has exactly one licensing constraint per licensing position, it does not rescue the analysis because, once again, it cannot produce the proper directionality effects. With only context-free markedness to adjudicate trigger control, the higher weighted of those constraints always wins out. To derive the proper directionality in (27), we need w(*LABIAL) > w(*DORSAL), but this predicts that labials always assimilate to dorsals, even when the labial is the onset consonant and the dorsal is the coda. This contradicts our understanding of Tamil: codas always assimilate to onsets. As a further example, the weights in (27) predict that initial-syllable coronal codas trigger progressive assimilation (*DORSAL is omitted for space):

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(28)

/t̪unpam/	Ident(Pl) 3	Lic(Pl, Ons) 2	Lic(Cor, σ_1) 2	*Lab 2	*H*
(☞) a. t̪un.bã		−1		−1	−4
💣 b. t̪un.dã	−1				−3
c. t̪um.bã	−1			−1	−5

Beyond Tamil, these predictions are typologically erroneous. The context-free *Labial and *Dorsal used here to salvage the PL-HG analysis predict a language in which the direction of assimilation is determined by featural markedness (as reflected in the relative weights of these constraints), a situation that does not appear to be attested, at least in the domain of consonantal place assimilation.[14] As discussed in Section 4.3, place assimilation always involves codas assimilating to onsets with limited exceptions. There seems to be no system that operates as the context-free markedness constraints predict. (This is in sharp contrast to voice assimilation, as we discuss in Section 4.5.)

4.4.4 *Summary*

To summarize, in this section, we have explored ways of repairing the PL-HG analysis. For a variety of reasons, neither introduction of additional licensing constraints nor inclusion of context-free markedness constraints in the analysis provides a sound account of Tamil. Only by introducing positional faithfulness could we arrive at an analysis that models Tamil without introducing new conceptual or typological problems. The combination of positional licensing and positional faithfulness retains some typological drawbacks in that positional licensing constraints for consonants remain, but that route is simpler and more empirically sound than the alternatives that avoid positional faithfulness.

4.5 *Trigger Control*

Positional faithfulness is often invoked to control the direction of assimilation – what Walker (2011) calls Trigger Control. This issue arose briefly in Section 4.4.2, and we turn our attention to it more fully here. (See Mullin

[14] This prediction is a natural consequence of adopting both positional licensing and context-free markedness constraints, two well-motivated constraint families. It may therefore seem to be an unavoidable prediction, but if our argument in Section 4.3 against allowing positional licensing to apply to consonantal features holds, we can eliminate the faulty prediction discussed in this paragraph. This is obviously incompatible with the PL-HG analysis though. It is also worth noting that in contrast to consonants, vowels do seem to show licensing-based assimilation that obeys context-free markedness; see Walker (2011) and the discussion of Lango in Section 4.5. This provides further support for restricting positional licensing to vocalic features.

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(2011) for a catalog of directional asymmetries in assimilation.) We argue that while not all directionality facts can be attributed to positional faithfulness, this constraint type is essential for certain kinds of processes. As in preceding sections, the discussion here is concerned with how well the analytical options perform with respect to their ability to produce the facts of Tamil and their typological implications.

In the PF-OT analysis, where *CORONAL, *LABIAL, and *DORSAL drive assimilation, IDENT(Place)-Onset ensures that codas assimilate to onsets. As we saw above, a similar trigger-control device is necessary under positional-licensing-based analyses. The tableau from (26) is repeated in (29). LICENSE(Non-Coronal, Onset) is satisfied as long as the adjacent consonants share place features; progressive and regressive assimilation are equally viable strategies.

(29)

/maɾam + kal/	LIC(Non-Cor, Ons) 4	ID(Pl) 3	LIC(Cor, Ons) 2	LIC(Cor, σ_1) 2	*H*
a. ma.ɾɜm.gɜ	−1(m)			−1(ɾ)	−6
☞ b. ma.ɾɜŋ.gɜ		−1(ŋ)		−1(ɾ)	−5
☞ c. ma.ɾɜm.bɜ		−1(b)		−1(ɾ)	−5

The alternatives considered above that rest on AGREE-style constraints invite similar ties, too, because like positional licensing, AGREE does not specify directionality. Consequently, some independent means of trigger control is required (Walker 2011). Here, a positional faithfulness constraint protecting onsets suffices. In (30), we give this constraint a greater weight than the other constraints to reflect the fact that onsets always remain faithful, but the same outcome is achieved as long as IDENT(Place)-Onset has a positive weight. (LICENSE(Coronal, Onset) is omitted for reasons of space; it assigns no penalties.)

(30)

/maɾam + kal/	ID(Pl)-Ons 5	LIC(Non-Cor, Ons) 4	ID(Pl) 3	LIC(Cor, σ_1) 2	*H*
a. ma.ɾɜm.gɜ		−1(m)		−1(ɾ)	−6
☞ b. ma.ɾɜŋ.gɜ			−1(ŋ)	−1(ɾ)	−5
c. ma.ɾɜm.bɜ	−1		−1(b)	−1(ɾ)	−10

It is our claim that positional faithfulness offers the best account of trigger control in Tamil-type coda assimilation wherein codas always assimilate to onsets. As this is a positional generalization, positional constraints are called for. Other potential trigger-control constraints do not produce the same result. We have already seen this with respect to context-free markedness. Similar results hold for context-free faithfulness, which can control directionality when it encourages

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faithfulness to a particular value of a feature. For example, IDENT(Dorsal) is an adequate substitute for IDENT(Place)-Onset in (30). However, as with context-free markedness, it predicts that labials will always assimilate to dorsals. Once again, the generalization is a positional one; since positional markedness cannot account for trigger control (i.e. the positional licensing constraint that drives assimilation does not choose directionality), that task must fall to positional faithfulness.

The utility of positional faithfulness in trigger control is well supported (e.g. Walker 2011), but as Jesney (2011a) points out, there are certain licensing-based phenomena that do not submit to this trigger-control device. For example, in Lango (Woock & Noonan 1979, Noonan 1992), [+ATR] harmony between roots and suffixes can be either progressive or regressive, depending on phonotactic and featural markedness considerations investigated by Smolensky (2006). Some examples are given in (31). ([–ATR] also harmonizes, but only progressively. We set this aside for the present purposes.)

(31) (a) *Progressive [+ATR] Harmony*

Root	*Gloss*	1SG, POSS	3SG, POSS
ŋùt	'neck'	ŋùt-ɔ́	ŋùt-é
wót	'son'	wód-ɔ́	wód-é
ém	'thigh'	ém-ɔ́	ém-é
ɲím	'forehead'	ɲím-ɔ́	ɲím-é

(b) *Regressive [+ATR] Harmony*

kɔ́m	'chair'	kòm-mí	'your (SG) chair'
còŋ	'chaff'	cùŋ-wú	'your (PL) chaff'
dɛ̀k	'stew'	dèk-kí	'your (SG) stew'
pí	'for'	pi̱-wú	'for you'
bɔ̀ŋɔ́	'dress'	bɔ̀ŋɔ́-ní	'your (SG) dress'
ìmáɲ	'liver'	ìmáɲ-í	'your (SG) liver'
mɔ̀tɔ̀kà	'car'	mɔ̀tɔ̀kɔ̀-ê	'cars'

Kaplan (2008a,b) argues that Lango's harmony is driven by a positional licensing constraint requiring [ATR] to coincide with the root: LICENSE(ATR, Root). Evidence for this comes from the longer roots in (31b): [+ATR] spreads only to the final root vowel, suggesting that obtaining membership in the root is the impetus of harmony. Spreading in either direction satisfies LICENSE(ATR, Root): progressive harmony replaces the suffix's unlicensed feature with one from the root and regressive harmony places the suffix's [ATR] feature in the root. The choice of directionality is made by constraints encouraging the avoidance of marked structure. For example, spreading does not create new high lax vowels, and this is responsible for some of the progressive harmony in (31a) (e.g. *[ŋùt-á]) and much of the regressive harmony in (31b) (*[kòm-mí]). Positional faithfulness is not well-suited for these facts because no position uniformly controls harmony, and the choice of directionality follows from markedness considerations. (Incidentally, the bidirectional nature of Lango's harmony also

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shows that building directionality into positional licensing itself is not a viable trigger-control option and therefore cannot address directionality issues in Tamil.)

Similar considerations can be at play in the domain of consonants, too, although the examples we are aware of do not involve place assimilation. Swedish, for example, shows bidirectional spreading of [–voice]: *högt* [hœkːt] 'high (NEUT)' (cf. *hög* [hœːg] 'high'); *läste* [lɛːˈstə] 'read,' with preterite suffix /-de/ (Hellberg 1974: 144–159). In Lombardi's (1999) OT analysis of these facts, positional faithfulness is outranked by a constraint promoting devoicing and another constraint requiring assimilation of voicing in clusters. As in Lango, positional faithfulness is irrelevant; featural markedness dictates directionality.[15]

Dutch displays something similar: while voicing assimilation between adjacent consonants is generally regressive (/klɑp + dør/ → [ˈklɑbdør] 'swing-door'), [–voice] spreads progressively to fricatives: /slaːp + zɑk/ → [ˈslaːpsɑk] 'sleeping-bag' (Mey 1968, van der Hulst 1980, Berendsen 1983, Lombardi 1996, Grijzenhout & Krämer 2000; data from Grijzenhout & Krämer 2000: 60). In Lombardi's (1996) analysis of these facts, a constraint prohibiting post-consonantal voiced fricatives outranks IDENT(laryngeal)-Onset; in the analysis of Grijzenhout & Krämer (2000), the onset faithfulness constraint holds only for stops, permitting a devoicing constraint to select [ˈslaːpsɑk] over *[ˈslaːbzɑk].

Beyond these cases, there are harmony systems in which trigger control is completely removed from both positional prominence and featural markedness, and instead any segment of a particular type (perhaps specifically the leftmost or rightmost segment of that type) controls harmony. For example, Hyman (2002) argues that in the absence of other directionality-controlling considerations (like positional prominence), vowel harmony is regressive by default, and in many nasal harmony systems, nasalization spreads from nasal segments regardless of their position (Walker 2000).

Walker (2011) catalogs a diverse set of constraint types that can be responsible for trigger control. Among these are positional faithfulness, generic faithfulness, markedness, and the local conjunction of markedness and faithfulness. To these we might add Mullin's (2011) constraints that prohibit spreading in one direction or the other simply by penalizing harmony that targets elements to the left or right of the trigger. See also Jesney (2011a: 71–72) for discussion of constraints that can distinguish candidates according to the source of harmony. The reason for such a wide range of trigger-control constraints is that each constraint type is inadequate on its own in the face of the full typology of directionality. However, this diversity of trigger-control sources is a strength, not a weakness: positional licensing leaves trigger control to other constraints, and we should not be surprised to find that

[15] We recall Kaplan's (2015c) observation that there are no overwrite systems for consonants. Swedish does not contradict this claim: this is not an overwrite system (in the sense that unlicensed features generally spread to a licensor). Instead, it is a system in which a marked segment (which sometimes happens to be in a possible licensing position) assimilates to an unmarked one.

any kind of constraint that might care about the outcome of feature movement or spreading controls directionality in one language or another. We should not reject positional faithfulness on the grounds that it cannot account for trigger control in all licensing-based (or other) harmony phenomena; no constraint type meets that criterion.

Lango, Swedish, and Dutch show that positional faithfulness is not the only means of trigger control, at least for [ATR] harmony and voice assimilation. Interestingly, consonantal place assimilation seems to always obey the directionality predictions of positional faithfulness except, as discussed in Section 4.3, when it comes to apicals, whose harmony is plausibly driven by the robustness of acoustic cues in VC transitions. Even the progressive harmony found at root/suffix boundaries is consistent with positional faithfulness – it shows root faithfulness. The interesting question, from this point of view, is why, aside from apicals, coda/onset place assimilation never shows the effects of non-positional means of trigger control. For example, while voice assimilation in Swedish favors the unmarked value of [voice], there seem to be no systems that favor assimilation toward unmarked place features. At present, we cannot explain this gap (though see Lombardi (2001) for an analysis of other differences between place and voice features), but it is significant because it suggests that positional faithfulness provides a nearly perfect means of trigger control for consonantal place assimilation.[16]

Returning to Tamil, there is an additional trigger-control issue that stems directly from the presence of multiple licensing constraints in the positional licensing-based analyses. It arises under both the original PL-HG analysis with just two licensing constraints (32a) and the repairs considered above with a third markedness constraint (represented in (32b) with the option involving a high-weighted LICENSE(Non-Coronal, Onset)). When a non-initial-syllable coda is a non-coronal and the following onset is coronal, the tie from (26) disappears, but, unfortunately, the winner is the candidate with progressive assimilation. To show the interaction most clearly, violations incurred by [ɾ] are omitted here.

[16] Noteworthy in this context is Korean, where regressive place assimilation occurs only with a coronal target and non-coronal trigger or a labial target and velar trigger (Iverson & Kim 1987, Cho 1988, Ahn 1998; data from Ahn 1998: 100): /sin pal/ → [simbal] 'shoes,' /tat+ki/ → [takk'i] 'closing,' /kam ki/ → [kaŋgi] 'flu.' Other combinations do not assimilate: /cip+to/ → [cipt'o] 'house as well' (*[citt'o]), /paŋ+to/ → [paŋdo] 'room as well' (*[pando]), /kaŋ+mul/ → [kaŋmul] 'river water' (*[kammul]). This system almost exemplifies the sort of markedness-driven pattern discussed in this paragraph, but it is still crucially a regressive-only pattern. The generalization seems to be that consonantal place assimilation is universally regressive (apart from apicals and morphological boundaries), but it can be conditioned by particular segmental properties.

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(32) (a)

/maram + t̪aan/	Id(Pl) 3	Lic(Pl, Ons) 2	Lic(Cor, σ_1) 2	*H*
a. ma.ɾɜm.d̪ãã		−1	−1	−4
(☞) b. ma.ɾɜn̪.d̪ãã	−1		−1	−5
💣 c. ma.ɾɜm.bãã	−1			−3

(b)

/maram + t̪aan/	Lic(¬Cor, Ons) 4	Id(Pl) 3	Lic(Cor, Ons) 2	Lic(Cor, σ_1) 2	*H*
a. ma.ɾɜm.d̪ãã	−1			−1	−6
(☞) b. ma.ɾɜn̪.d̪ãã		−1		−1	−5
💣 c. ma.ɾɜm.bãã		−1			−3

Progressive assimilation wins here because, while the intended winner addresses only the faithful candidate's violation of LICENSE(Place, Onset), progressive assimilation also eliminates a violation of LICENSE(Coronal, σ_1). In (32a), the licensing constraints gang up on IDENT, as per the design of the system, but this time with incorrect results. (This is not unlike the problem we encountered in (28).) Moreover, in (32b), with two ways to satisfy LICENSE(Non-Coronal, Onset), the strategic choice is the one that also avoids a violation of another constraint. As usual, IDENT(Place)-Onset corrects this problem by blocking all progressive assimilation.

An anonymous reviewer points out that Serial HG might address the directionality problem. In the serial theory of assimilation developed by McCarthy (2008), assimilation is a two-step process: the underlying features of the assimilating segment must first be eradicated and then the new features spread to that segment. This is illustrated in (33). Consistent with McCarthy's analysis, we have replaced IDENT(Place) with MAX(Place) (with a reduced weight) and added HAVEPLACE to ensure that the coda consonant surfaces with place features. Capitalization in candidates represents placelessness. LICENSE(Non-Coronal, Onset) first motivates deletion of the coda place features (33a), and then the place features of the following onset spread to the coda to satisfy HAVEPLACE (33b). Crucially, in the first step, only deletion of the coda's place features avoids a violation of LICENSE(Non-Coronal, Onset); assimilation is necessarily regressive.

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(33) (a)

/ma.ɾɜm.gɜ/	Lic(Non-Cor, Ons) 4	Max(Pl) 2	HavePl 1	*H*
a. ma.ɾɜm.gɜ	−1			−4
☞ b. ma.ɾɜN.gɜ		−1	−1	−3
c. ma.ɾɜm.Dɜ	−1	−1	−1	−7

(b)

/ma.ɾɜN.gɜ/	Lic(Non-Cor, Ons) 4	Max(Pl) 2	HavePl 1	*H*
a. ma.ɾɜN.gɜ			−1	−1
☞ b. ma.ɾɜŋ.gɜ				0

The analysis succeeds because the position that undergoes assimilation is the same position that triggered the violation of positional licensing in the first place: the non-licensing position assimilates to the licensor. However, as we have seen, positional licensing effects need not work in this way. Consonantal systems do not show assimilation of the licensor, but vocalic systems do, as in Central Veneto's metaphony (see Section 4.3). A similar metaphony pattern from Lena, a Romance variety spoken in Spain, exhibits height assimilation of stressed vowels that is triggered by a suffix /u/ (Hualde 1989, 1998; also Neira Martínez 1955, 1983, cited in Walker 2011):

(34) trwébanos trwíbanu 'beehive (M, PL/M, SG)'
burwébanos burwíbanu 'wild strawberry (M, PL/M, SG)'

Simplifying things somewhat, Walker's (2011) analysis of this system relies on a positional licensing constraint requiring [+high] to appear in a stressed syllable: License([+hi], *σ́*).[17] For both Central Veneto and Lena, the serial analysis makes the wrong prediction. As (35) shows, the candidate that initiates the correct path – removing the height feature of the stressed vowel so that assimilation can occur at the next step – is harmonically bounded by each of the alternatives because it incurs a faithfulness violation without addressing the licensing issue.

[17] More precisely, her analysis requires vowel-height features that coincide with [+high] to appear in a stressed syllable – i.e. all height features for high vowels are subject to licensing, not just [+high]. This more nuanced formulation accommodates the behavior of stressed /a/, which raises to a mid vowel: /páʃar-u/ → [péʃaru] 'bird (M, SG)'; cf. [páʃara] 'bird (FEM, SG).' We adopt the simpler License([+hi], *σ́*) for ease of exposition.

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(35)

/trwébanu/	Lic([+hi], $\acute{\sigma}$) 2	HavePlace 1	*H*
a. trwébanu	−1		−2
(☞) b. trwÉbanu	−1	−1	−3
💣 c. trwébanO		−1	−1

This problem could be rectified by allowing the stressed vowel to assimilate before losing its [−high] feature. That is, the winner of (35) could be [trwɤ́banu], where ɤ represents a front vowel specified as both [−high] and [+high]. In the subsequent step, [−high] could be removed to satisfy a constraint banning multiple specifications for one feature (or something similar). There are two problems with this approach. First, it predicts that ɤ can surface in some language where the constraint against multiple specifications is outweighed by constraints that block its effect. Second, if the path through ɤ is allowed for metaphony, it should also be allowed for coda place assimilation (doubly articulated consonants are attested, after all), and we now predict that onsets can assimilate to codas through a similar chain of events, contrary to fact.

The serialist approach to directionality, then, either undergenerates by predicting a universal directionality that is at odds with the facts of languages like Lena, or it overgenerates by predicting that onsets may assimilate to codas. On the other hand, the contrasting directionalities in Tamil and Lena are simple to capture with positional faithfulness: Ident-Onset is decisive in the former and Ident-σ_{Final} in the latter.[18] (For a defense of Ident-σ_{Final} as a well-formed positional faithfulness constraint, see Barnes (2006), Walker (2011), and Kaplan (2015c).)

In sum, discarding positional faithfulness deprives the theory of an essential means of trigger control. This is not to say that trigger control must always be dictated by positional faithfulness, but this constraint type is uniquely suited to account for directionality in patterns like Tamil's.

5. Discussion and Conclusion

Broadly speaking, we have presented two arguments that positional faithfulness is a necessary constraint type in HG. First, even though positional licensing offers an analysis of LMC in HG, not all LMC phenomena are suitable for that approach. The PL-HG schema for LMC includes *w*(Faith) > *w*(License-1), *w*(License-2), rendering each licensing constraint inert unless both licensing constraints are violated. As a result, neither licensing constraint may be active in any non-LMC

[18] Central Veneto's metaphony is somewhat more complex from a trigger-control perspective because the trigger need not be the final vowel. In that case, Walker (2011) uses constraint conjunction to prevent lowering of a vowel in an unstressed syllable.

phenomenon in the language. This condition is not met in Tamil: one of the licensing constraints that accounts for coronals' LMC pattern, LICENSE(Place, Onset), is also responsible for coda place assimilation of non-coronals. Consequently, the LMC weighting requirements, particularly w(IDENT(Place)) > w(LICENSE(Place, Onset)), are incompatible with the necessary weights for the account of non-coronals. The simplest and best resolution of this impasse is to restore positional faithfulness's role in producing LMC.

The second argument for positional faithfulness concerns typological generalizations. The problems here fall into three categories. First, positional licensing constraints that govern consonantal features predict unattested consonantal patterns – because of the absence of overwrite systems for consonants, the typology of licensing-based consonantal phenomena is consistent with the predictions of positional faithfulness but not positional licensing. This implies that positional licensing should not be allowed to manipulate consonants, placing the LMC pattern of Tamil in the hands of positional faithfulness.

Second, specific positional licensing constraints required for the analysis of Tamil are problematic because they target unmarked features and therefore predict unattested languages in which, say, coronals surface only in onsets. This particular prediction stems from LICENSE(Coronal, σ_1) – a crucial component of the PL-HG analysis – and other comparable predictions arise from the constraints necessary to reconcile the PL-HG analysis with Tamil's non-coronals.

Third, certain trigger-control facts call for an analysis grounded in positional faithfulness. Consonantal place assimilation in Tamil is always regressive, and we argued that the best account of this fact lies in a positional faithfulness constraint holding for onsets. Therefore, even if the typological concerns summarized in the preceding paragraphs are dismissed, positional faithfulness is still necessary in an analysis of Tamil grounded in positional licensing. Other approaches to trigger control fail in one way or another, either in Tamil (e.g. context-free markedness) or when applied to other languages (e.g. serialism for Lena's metaphony). Moreover, the directionality facts of Tamil's assimilation conform to a larger crosslinguistic generalization: in place assimilation involving codas and adjacent onsets, codas (almost) always assimilate to onsets. We argued that while positional faithfulness does not have a monopoly on trigger control, it is uniquely qualified to handle this particular type of system. Even some of the few exceptions to this crosslinguistic regularity support positional faithfulness: onsets that undergo assimilation at root/suffix boundaries reflect root faithfulness.

Setting aside typological concerns, the ease with which positional faithfulness accounts for Tamil is in contrast to the uncomfortability (at the very least) encountered by positional licensing. This comparison reveals that despite cursory similarities, these constraint types operate in very different ways, and we suspect that the current paper sheds light on only a small fraction of their differences. A larger exploration of the way in which the two constraint types operate, perhaps beginning with our conclusions here, may pin down more general differences

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between them and provide a more comprehensive and rigorously defined assessment of the kinds of processes each is suitable for.

We do not question Jesney's (2011b) finding that positional licensing is more powerful in HG than in OT; in fact, positional licensing's ability to account for (non-Tamil-like) LMC under HG may be a good argument for HG over OT in that it shows that HG has greater analytical flexibility which might prove advantageous. Jesney's results point to the intriguing possibility that there may be much about positional licensing's capabilities under HG that remains undiscovered.

Nor do we dispute the empirical shortcomings of positional faithfulness that Jesney (2011c) discusses (see also Beckman 1999). For example, positional faithfulness normally preserves elements in a particular position, forcing markedness constraints to go unsatisfied. However, under the right ranking, this state of affairs can be subverted: the marked element does not surface faithfully in the targeted position but rather moves out of that position so that markedness constraints can trigger a repair. Jesney (2011c) provides the scenario in (36). With IDENT(voice)-Onset and *VOICEDOBS outranking ONSET, underlying intervocalic voiceless obstruents surface faithfully as onsets (36a). However, voiced obstruents are syllabified as codas, where they are not subject to IDENT(voice)-Onset and can be devoiced by *VOICEDOBS. Positional faithfulness and markedness conspire to suppress constraints on prosodification.

(36) (a)

/pata/	IDENT(voice)-Onset	*VOICEDOBS	IDENT(voice)	ONSET
☞ a. pa.ta				
b. pat.a				*!

(b)

/pada/	IDENT(voice)-Onset	*VOICEDOBS	IDENT(voice)	ONSET
a. pa.da		*!		
b. pad.a		*!		*
c. pa.ta	*!		*	
☞ d. pat.a			*	*

Furthermore, if *COMPLEXCODA is high-ranking, the second consonant in a VCCV sequence cannot be syllabified as a coda. As an onset, it is subject to IDENT(voice)-Onset. The result is 'a language. . . that allows contrastive voicing in medial onsets just when there is a preceding consonant in coda position' (Jesney 2011c: 3), a pattern that is unattested.

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What do we make of this in light of our argument that positional faithfulness is necessary in HG? Jesney (2011c) argues that Harmonic Serialism (e.g. Prince & Smolensky 1993/2004, McCarthy 2000) avoids the positional-faithfulness-related pathologies that OT suffers from, and a comparable solution is available for HG, namely Serial HG (Pater 2007, Kimper 2011) – as we argued above, serialism is inadequate for trigger control, but it has other advantages. Retaining positional faithfulness need not mean accepting pathologies like the one in (36).

There is obviously much more to explore concerning positional licensing's properties in HG, but we suspect that the significant differences between its behavior in OT and HG will fall into three categories. First, because HG alters the way in which constraints interact with one another, the tension between positional licensing and faithfulness is resolved in new ways. For example, no longer does the higher ranked/weighted constraint have unfettered control: when satisfaction of positional licensing requires too much unfaithfulness, the accumulated violations of a lower weighted faithfulness constraint can block positional licensing's normal effect (Kaplan 2015a,b, to appear). Such systems appear to be unattested. This and other pathologies may require modifications to the positional licensing formalism.

Second, since positional licensing is more powerful in HG than in OT, there may be some systems that are out of reach for these constraints in OT but not HG. Licensing in Multiple Contexts is a prime example of this kind of phenomenon; although we have argued that Tamil is not properly analyzed with positional licensing, other LMC systems may be better suited for this sort of analysis. Beyond LMC, there may be (classes of) preservation and overwrite systems that have not been identified as licensing-driven phenomena because an analysis is possible only in HG.

Third, the greater power of HG-based positional licensing may open up new avenues for analysis of already well-studied phenomena. Chamorro umlaut (e.g. Chung 1983) illustrates this possibility. In this language, front vowels in immediately pretonic prefixes and clitics trigger fronting of the (stressed) root-initial vowel:

(37)	nána	'mother'	i nǽna	'the mother'
	gúmaʔ	'house'	i gím̀aʔ	'the house'
	cúpa	'cigarettes'	i cípa	'the cigarettes'
	sóŋsuŋ	'village'	i séŋsuŋ	'the village'

If the front vowel is not immediately pretonic, umlaut does not occur (38a); likewise if it is not in an affix or clitic (38b).

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(38) (a) pulónnun ‘trigger fish’ i pulónnun ‘the trigger fish’
*i pilónnun, *i pilénnun
mundóŋgu ‘cow’s stomach’ i mundóŋgu ‘the cow’s stomach’
*i mindóŋgu, *i mindéŋgu

(b) mì̀-mantiká-ɲa
abounding.in-fat-more
‘more abounding in fat’
*mì̀mantikáɲa

Under the analysis of Kaplan (2008b), umlaut results from LICENSE ([–back]$_{\text{Pretonic}}$, Root), which requires a pretonic [–back] feature to appear in the root. Only the front vowels in (37) violate this constraint (before umlaut occurs): the vowels in (38a) are not subject to LICENSE([–back]$_{\text{Pretonic}}$, Root) because they are not pretonic, and the pretonic vowel in (38b) is already in the root and therefore satisfies the licensing constraint.

The vowels that trigger umlaut are in a doubly marked position. Prefixes are morphologically weak (Beckman 1999, Walker 2011, Kaplan 2015c, among others), and Kaplan (2008b) argues that the immediately pretonic syllable is especially weak in Chamorro on the grounds that it alone cannot bear stress.[19] LICENSE([–back]$_{\text{Pretonic}}$, Root) reflects this ‘double markedness’, but HG presents the opportunity to capture each of these dimensions of markedness in its own constraint. If constraints along the lines of LICENSE([–back], Root) and LICENSE(V_{Pretonic}, $\acute{\sigma}$) can gang up on IDENT to trigger umlaut, then the analysis will more transparently reflect the twin markedness considerations that drive umlaut instead of conflating them as an OT account must do.

Chamorro umlaut, to the best of our knowledge, is equally compatible with the one-constraint and two-constraint analyses, but the ability to separate the drivers of umlaut-like systems into distinct licensing constraints may prove advantageous if, for example, a third constraint must have a greater weight than one of the erstwhile conflated constraints but not the other. We are aware of no phenomenon that requires this arrangement, but the possibility merits further investigation.

In summary, HG may have advantages over OT, including the LMC potential of positional licensing. However, the opportunity to discard positional faithfulness is not one of them. Neither OT nor HG can escape the redundancy that comes with admitting both positional licensing and positional faithfulness. This state of affairs calls for more research into these two constraint types. With better defined roles for each, perhaps the redundancy can be eliminated without sacrificing the advantages of one or the other.

[19] Stress clash occurs in Chamorro under certain circumstances, except that the syllable immediately preceding primary stress cannot bear stress: $\acute{\sigma}\grave{\sigma}$ is permitted but not $\grave{\sigma}\acute{\sigma}$.

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