Compensatory Lengthening via Mora Preservation in OT-CC: Theory and Predictions[*]

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1. Introduction

Work on phonological representations in the 1980's led to a paradigm shift from slot-based theories of timing (Clements and Keyser 1983, Levin 1985) to weight-based theories (Hyman 1985, McCarthy and Prince 1986, Hayes 1989). One of the crucial arguments in favor of moraic theory came from compensatory lengthening (CL), the large class of phenomena involving deletion of a segment and lengthening of another, often adjacent, segment. Part of the argument in favor of moraic theory is that it offers a more restricted characterization of CL patterns than slot-based theories. In particular, it limits CL triggers to segments dominated by a mora. As a consequence, the theory predicts that languages with CL processes are restricted to those in which Coda consonants contribute weight to the syllable. When paired with moraic theory, the architecture of an OT-CC (Optimality Theory with Candidate Chains) grammar (McCarthy 2007a) restricts the range of possible CL languages beyond that of moraic theory alone. Specifically, I will demonstrate that CL triggers in OT-CC are restricted to those segments which share a mora with another segment. As a consequence, OT-CC predicts that CL is possible in only a specific subset of languages that allow weight-bearing Codas.

Although much work in the "classic" Optimality Theory framework (Prince and Smolensky 1993/2004) has adopted the mora as a prosodic constituent, the framework cannot straight-forwardly implement the intuition behind the moraic theory treatment of CL (Sprouse 1997, Kavitskaya 2002). Since classic OT provides just two levels of representation, input and surface, preservation is not possible unless the structure to be preserved is in the underlying representation. For this reason, CL by mora preservation

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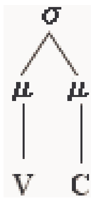
has defied implementation in classic OT for the same reason as *counter-bleeding opacity* more generally (Section 4.2, Goldrick 2001, Topintzi 2007, McCarthy 2003, 2007a).

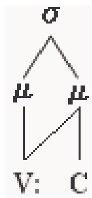
Although approaching CL as a sequence of processes is impossible in two-level OT, it can be accomplished in versions that are serial. In OT-CC, serial links in a candidate chain are valid only if each link is harmonically improving and improvement is gradual, providing a reasonably constrained theory of intermediate levels of representation. In principle, a framework that allows candidate chains does not require that CL involve preservation of input structure. Structure not in the input may built in subsequent links and altered in response to the demands of markedness. Thus, OT-CC can, at least in principle, capture the insight of Hayes (1989) by preserving moras that do not occur in the underlying representation.

In practice, however, I will show that OT-CC requires a different conditioning environment for CL than all past theories. The prerequisite that CL languages have moraic Codas (Hayes 1989), as in (1), is insufficient in OT-CC, which further requires that CL languages have branching moras, as in (2). Further, since this prediction stems directly from conditions on chain well-formedness, it is an unavoidable consequence of the theory.

(1) CL not possible



(2) CL possible



Thus, the OT-CC analysis of CL allows incorporation of some of the insights of derivational analysis while leading to a new empirical prediction regarding the prosodic structure of languages with synchronic CL. The remainder of this paper is organized as follows. Section 2 briefly reviews the core aspects of OT-CC as relevant to this paper. Section 3 discusses a case of CL in Komi Ižma (KI) augmenting well-known data points from Harms (1968: 104-105) with new data from Batalova (1982) and then illustrates how core components of OT-CC prevent straight-forward import of the moraic theory account of CL. Section 4 provides the solution to CL in KI using OT-CC and section 5 discusses predictions of the analysis.

2. Chain Construction and Evaluation in OT-CC

Like classic OT, OT-CC (McCarthy 2007ab) is a competition-based framework in which ranked constraints evaluate a set of candidate outputs. The primary innovation in OT-CC, however, is in the nature of the candidates. Candidates in classic OT are individual forms. In OT-CC, however, a candidate consists of a chain of pronounceable output forms, each link of which is subject to conditions on well-formedness.

A valid chain in OT-CC begins with the most harmonic fully faithful candidate (FFC). The FFC is selected by evaluating a set of candidates that do not violate any faithfulness constraints with respect to the hierarchy of markedness constraints. Once the FFC is selected, subsequent links in the candidate chain must meet the requirements of *gradualness* and *harmonic improvement*, defined in (3).

(3) Conditions on link formation (McCarthy 2007a: 61)
(a) gradualness: "successive forms in a chain must monotonically increase in unfaithfulness relative to the input. The monotonic increase has a slope of one LUM (local unfaithful mapping) per form in the chain."

(b) harmonic improvement (via local optimality): "every non-initial form in a chain is more harmonic than its predecessor" as well as "every other form that can be derived by violating the same basic faithfulness constraint."

The main effect of gradualness is that each link in the chain accrues one and only one "basic" faithfulness violation[1] or LUM (local unfaithful mapping). Harmonic improvement is a consequence of *local optimality*, which requires that each link is the maximally harmonic instantiation of a specific faithfulness violation.

Once candidate chains are generated in OT-CC, EVAL has access to two types of information in a candidate chain, the structure of its most harmonic member, or terminal link (TL), and the path of improvement in a chain, encapsulated in the ordering of LUMs. While markedness and faithfulness constraints familiar from classic OT evaluate the TL, a new constraint type, called a precedence constraint, henceforth PREC, evaluates the ordering of LUMs.

Both of the core innovations of OT-CC, chain well-formedness and PREC constraints, play a crucial role in the analysis of KI to follow. While PREC constraints function as they do in McCarthy (2007a) by favoring the opaque winner, chain well-formedness conditions eliminate a number of possible CL derivations, which forces the theory into a novel prediction regarding languages with CL.

3. Komi Ižma CL

A case of what Hayes (1989) calls "classic" CL is exemplified by the Ižma dialect of Komi[2], where deletion of /l/ in Coda position is accompanied by lengthening of the

[1] "basic" faithfulness constraints include MAX(X), DEP(X), IDENT(X), LINEARITY (McCarthy 2007a: 79) and NOSPREAD(X) (McCarthy 2007b).

[2] The Komi languages, also known as Ziryen, Ziryene, or Zyrian, are spoken spoken by ethnic inhabitants of the Komi province of Russia and, together with Udmurt (a.k.a Votyak), comprise the Permic group of the Finno-Ugric language family (Tsypanov 1992).

preceeding vowel[3]. Because the trigger is transparent and the process is productive, Kavitskaya (2002: 152-153) notes that CL in Komi Ižma (KI) requires a synchronic solution. To demonstrate the productivity of the process, (4) and (5) show data across morphological contexts (verbal and nominal paradigms respectively). The first column in (4a) shows the stem form of KI verbs. Column two shows that when a vowel is suffixed to the /l/-final stems, /l/ surfaces in Onset position. When the suffix begins in a consonant, as in the infinitive suffix in column three, stem-final /l/ would be parsed as a Coda. In just these environments, /l/ is deleted. The lengthened vowel that surfaces in place of the deleted /l/ is the trademark of "classic CL". The stems in (4b) illustrate that consonants other than /l/, including sonorants, are not deleted in Coda position.

(4) Partial verbal paradigm (Batalova 1982)

(a) /l/ is preserved only in Onset

STEM	1 SG. PAST	INFINITIVE	GLOSS
kɨl	kɨ.li	kɨː.nɨ	'to hear'
ol	o.li	oː.nɨ	'to live'
çɨl	çɨ.li	çɨː.nɨ	'to sing'
algɨ	aː.gɨ.yi	aː.gɨ.nɨ	'to scream'
palgɨ	paː.gɨ.yi	paː.gɨ.nɨ	'to wear'
pol	po.li	poː.nɨ	'to fear'

(b) Other consonants surface in Onset/Coda

STEM	1 SG. PAST	INFINITIVE	GLOSS
lɨj	lɨ.ji	lɨj.nɨ	'to shoot'
mun	mu.ni	mun.nɨ	'to go'
leb	le.bi	leb.nɨ	'to fly'
pɨr	pɨ.ri	pɨr.nɨ	'to drop it'
pɨrt	pɨr.ti	pɨrt.nɨ	'to carry in'
sut	su.ti	sut.nɨ	'to stand up'

A similar pattern of CL surfaces in the nominal paradigm, given in (5). When stem-final /l/ is followed by a vowel, as in the elative singular case in column two, it is parsed as an Onset and surfaces faithfully. In the nominative singular, column three, which lacks an overt case marker, the would-be Coda /l/ fails to surface. As in the verbal paradigm, deletion is accompanied by lengthening of the preceding vowel. The phonological generalization is stated in (6).

[3] Komi dialects can be divided into four main dialect types based on the distribution of /l/ in the surface phonology: (type 1) /l/ is preserved in all surface positions; (type 2) /l/ changes to /v/ in Coda position and is preserved elsewhere; (type 3) /l/ deletes in Coda position and triggers lengthening of the preceding vowel; (type 4) /l/ changes to /v/ in all positions (Sebeok and Garvin 1945).

(5) Partial nominal paradigm (Batalova 1982)

(a) /l/ is preserved only in Onset

STEM	ELATIVE SG	NOM SG	GLOSS
nɨl	nɨ.lɨs	nɨː	'young girl'
vəl	və.lɨs	vəː	'horse'
pil	pi.lɨs	piː	'cloud'
pul	pu.lɨs	puː	'berry'
pɨl	pɨ.lɨs	pɨː	'net'
lol	lo.lɨs	loː	'soul'

(b) other consonants surface in Onset/Coda

STEM	ELATIVE SG	NOM SG	GLOSS
gort	gor.tɨs	gort	'house'
tɨ	tɨ.jɨs	tɨ	'lake'
pi	pi.jɨs	pi	'son'
pu	pu.jɨs	pu	'tree'
ʃor	ʃo.rɨs	ʃor	'river'
koz	ko.zɨs	koz	'fur tree'

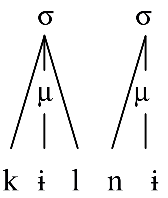
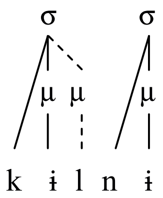
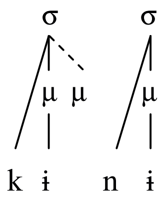
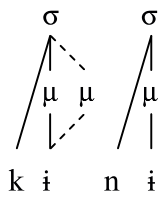
(6) Komi Ižma CL: deletion of /l/ in Coda position is accompanied by lengthening of the preceding vowel.

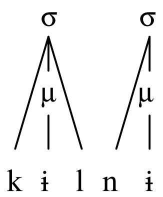
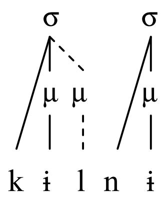
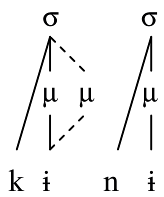
Having established the generalization, we can now illustrate how conditions on chain formation in OT-CC eliminate *a priori* a number of possible derivations for CL and force the theory to make a novel typological prediction.

The classic CL derivation, exemplified in (7a) below, is amongst the victims ruled out by the basic architecture of an OT-CC grammar. The first link in the chain is the FFC, and each subsequent link violates one and only one LUM, satisfying *gradualness*. The problem with the chain, however, is the floating mora structure in Link 3.

The Correspondence Theory of faithfulness (McCarthy and Prince 1995) alleviates the need to employ unparsed segments or floating prosodic structures as formal devices. On the assumption that GEN, therefore, does not produce stray elements, Link 3 is not a valid link candidate. Given this roadblock, we turn our attention to (7b), which forgoes the floating mora, moving directly from a valid link candidate in Link 2 to the TL in Link 3. This step requires that two basic faithfulness constraints, MAX-C and DEPLINK-μ, are violated in the same step. (7b), therefore, is invalid by *gradualness*, a core tenet of chain formation in OT-CC.

(7) Chains ruled out by conditions on chain formation

/ kɨl-nɨ/	Link 1	Link 2	Link 3	Link 4
invalid chain (a)				
LUM:		DEP-μ	MAX-C	DEPLINK-μ

/ kɨl-nɨ/	Link 1	Link 2	Link 3
invalid chain (b)			
LUM:		DEP-μ	MAX-C, DEPLINK-μ

Since conditions on chain well-formedness eliminate the standard CL derivation in (7), an OT-CC solution to the KI data requires that a new route to CL be discovered. Further, since CON functions both in the construction of chains and in the evaluation of the TL, it must be shown that the same ranking of CON that yields a CL candidate chain in compliance with *gradualness* and *local optimality* also prefers that chain to all other candidates. The next section produces just such a solution.

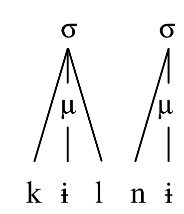
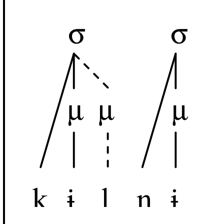
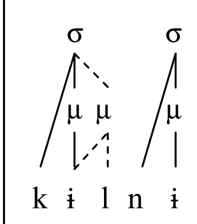
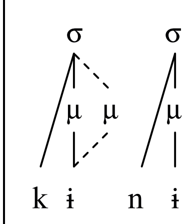
4.0 An OT-CC account of Komi Ižma CL

Since each link in a candidate chain is a product of GEN, the floating mora in Link 3 of (7a) invalidates that chain. The problem with the CL chain in (7b) is that it spreads the mora association in the same step that it deletes a consonant. What is needed, then, is a link following Link 2 in (7a) which neither *abandons the mora* nor *deletes a segment* while still *violating a LUM* and *improving on markedness*. In this section, I will introduce a set of representations and constraints that meet these criteria.

4.1 Valid CL chains

The crucial prosodic representation necessary to accomplish CL in OT-CC involves sharing a mora between vowel and Coda. This step, shown in (8: Link 3), completes the CL chain in compliance with well-formedness conditions. After the mora is inserted in Link 2, a new association line connecting the mora to the vowel is inserted in Link 3 in violation of DEPLINK-μ. This step is crucial because it allows for the subsequent deletion of *l* without violating *gradualness*. In order to show that this chain satisfies *local optimality* it will be necessary to motivate a grammar that selects each link as the most harmonic instantiation of the given LUM.

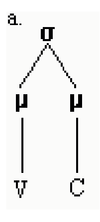
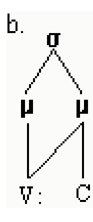
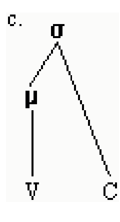
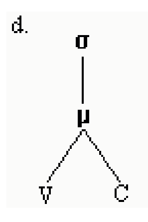
(8) Valid chain that implements CL

/kɨl-nɨ/	Link 1	Link 2	Link 3	Link 4
Chain (b)				
LUM:		DEP-μ	DEPLINK-μ	MAX-C

It is therefore necessary to determine the ranking of markedness constraints on mora association. I will adopt the set of constraints in (9), which are motivated in Broselow *et al.* (1997). These constraints appear under various guises in a large body of work in classic OT. The parentheses following the constraint names from Broselow *et al.* identify common aliases which I will use throughout this paper to refer to these constraints.

(9) Markedness Constraints on mora association (Broselow et. al. 1997)
(a) MORAICCODA (WBP): all Coda consonants must be dominated by a mora
(b) NOSHAREDMORA(NOSHARE-μ): Moras should be linked to single segments.
(c) NOCMORA(*C_μ): The head of a mora must be a vowel (see also Morén 2001).

(10) Illustration of markedness constraints

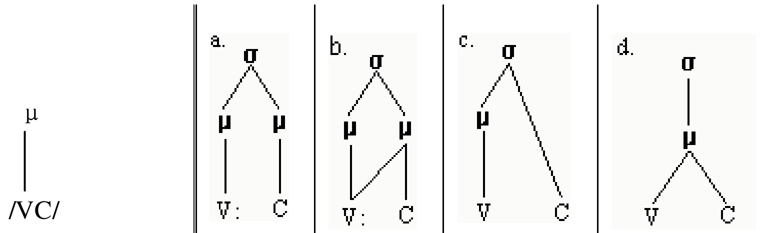
				
WBP	✓	✓	*	✓
NOSHARE-μ	✓	*	✓	*
*C_μ	*	✓	✓	✓

The table in (10) complements the written definitions in (9) with an explicit illustration of the structural configurations which give rise to violations of each of the markedness constraints. The table shows that the constraints are in conflict, such that no single prosodic representation of a VC sequence satisfies all constraints. Although (10c) obviously satisfies *C_μ, the structures in (10b) and (10d) are also in compliance. This is because the constraint does not penalize a moraic consonant unless the consonant is the head of the mora.

The markedness constraints in (9) interact with the battery of faithfulness constraints defined in (11). In addition to the common Correspondence Theoretic constraints DEP-μ and MAX-μ, the list includes DEPLINK-μ, which is formally identical to NO-SPREAD(τ, ς) (McCarthy 2000).

(11) Faithfulness constraints on mora association[4]
(a) DEP-μ: every mora in the output has a correspondent in the input
(b) MAX-μ: every mora in the input has a correspondent in the output
(c) DEPLINK(MORA, SEGMENT): for moras and segments in correspondence, mora-to-segment links in the output correspond to mora-to-segment links in the input. (NO-SPREAD(τ, ς) in McCarthy 2000)

(12) Illustration of faithfulness constraints for an input /VC/



	a.	b.	c.	d.
DEP-μ	*	*	✓	✓
MAX-μ	✓	✓	✓	✓
DEPLINK-μ	✓	✓	✓	*

As faithfulness constraints evaluate the mapping between forms, it is necessary to illustrate their behavior using pairs of structures. (12) shows how each constraint in (11) evaluates the IO mapping from an underlying $V_\mu C$ sequence, the most illustrative UR for our purposes, to each of the output structures in (12a-d). (12c) provides the fully faithful parse of this input. The other representations violate faithfulness by either inserting a mora, as in (12a) and (12b), or inserting an additional link between elements in IO correspondence, (12d). Given the input under consideration here, (12b) satisfies DEPLINK-μ despite introducing two mora-segment links not in the UR. This is tolerated because the mora in these links is not in correspondence with a mora in the input. Note, therefore, that moras in violation of DEP-μ never violate DEPLINK-μ.

With the constraints in (9) and (11) in hand, we can now walk through the rankings necessary to produce the chain in (8) which, as it turns out, is the only ranking

[4] These constraints are encapsulated in a single constraint in Broselow et. al. (1997) defined as follows "MORAFAITH: If the number of moras linked to S_i = n, and $S_i \Re S_o$, then the number of moras linked to S_o = n."

of these constraints capable of producing a CL candidate chain. Since it is the progression from Link 2 to Link 4 that is of primary interest, for reasons of space, I will not motivate the form of the FFC posited in Link 1 and focus the discussion on subsequent links.

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Link 2 of the CL chain in (8) is minimally differentiated from Link 1 (the FFC) by a mora—present in Link 2 but absent in Link 1. As this change involves a single LUM (DEP-μ), it is in accord with *gradualness*. Since, however, Link 1 satisfies $*C_\mu$ while violating WBP and Link 2 satisfies WBP while violating $*C_{\mu}$., Link 2 can only be harmonically improving if WBP dominates both $*C_\mu$ and DEP-μ, as in (13).

(13) WBP >> $*C_\mu$, DEP-μ

Next, the addition of a link between the vowel and the second mora minimally differentiates Link 3 from Link 2. Since both of these elements in Link 3, the mora and the vowel, are in correspondence with elements in Link 2, the addition of the association line violates DEPLINK-μ. On the assumption that this is a basic faithfulness constraint (McCarthy 2007b), Link 3 satisfies *gradualness*. As mentioned in the preceding paragraph, the structure in Link 2 violates $*C_\mu$. It also, however, satisfies NOSHARE-μ. In contrast, Link 3 violates NOSHARE-μ while satisfying $*C_\mu$. Thus, for this step to be harmonically improving, $*C_\mu$ must dominate NOSHARE-μ and DEPLINK-μ.

(14) WBP >> $*C_\mu$, DEP-μ >> NOSHARE-μ, DEPLINK-μ

Lastly, to complete the derivation of this candidate chain, Link 4 lacks a segment present in Link 3. This correspondence failure produces one and only one LUM (MAX-C), and constitutes harmonic improvement only if NOCODA-L dominates MAX-C. The data in (4b) and (5b) showed that other consonants do not delete in Coda position. Therefore, MAX-C must dominate the general version of NOCODA. These rankings are summarized in (15).

(15) NOCODA-L >> MAX-C >> NOCODA

According to the constraint rankings in (14) and (15), the chain in (8) satisfies both *gradualness* and *local optimality*. It is not, however, the only candidate chain that meets these requirements. The table in (16) lists the CL chain from (8) as chain (b) along with other valid chains. Each of these chains begins with the FFC. Chain (a) improves on the FFC by adding a mora. Chain (c) improves on the FFC in a different way, by deleting the Coda /l/. Chain (d) improves on the FFC by first adding a mora and, then, takes a second step towards harmony by spreading the mora link to the preceding vowel. Although this step violates DEPLINK-μ, the violation is motivated by satisfaction of the higher ranked $*C_\mu$.

(16) Valid Chains for input / kɨl, nɨ/

	CANDIDATE CHAIN	LUMSEQUENCE
a.	< kɨ$_{\mu}$l.nɨ$_{\mu}$, kɨ$_{\mu}$l$_{\mu}$.nɨ$_{\mu}$ >	<DEP-μ>
b.	< kɨ$_{\mu}$l.nɨ$_{\mu}$, kɨ$_{\mu}$l$_{\mu}$.nɨ$_{\mu}$, kɨ$_{\mu\mu 1}$l$_{\mu 1}$.nɨ$_{\mu}$, kɨ$_{\mu\mu}$.nɨ$_{\mu}$ >	<DEP-μ, DEPLINK-μ, MAX-C>
c.	< kɨ$_{\mu}$l.nɨ$_{\mu}$, kɨ$_{\mu}$.nɨ$_{\mu}$ >	<MAX-C>
d.	< kɨ$_{\mu}$l.nɨ$_{\mu}$, kɨ$_{\mu}$l$_{\mu}$.nɨ$_{\mu}$, kɨ$_{\mu\mu 1}$l$_{\mu 1}$.nɨ >	<DEP-μ, DEPLINK-μ >
e.	< kɨ$_{\mu}$l.nɨ$_{\mu}$ >	<>

4.2 The Opaque Winner

Now that we have generated the most informative valid chains, we can complete the solution to CL in OT-CC, by showing that the same constraint ranking involved in link generation via *local optimality* also pick out the right winner in the final evaluation. There is, however, one constraint type in OT-CC that is involved in the evaluation of candidate chains but plays no role in the construction of chains. Since PREC constraints, a key part of the OT-CC opacity solution, assign violations based on the ordering of LUMs, they cannot be evaluated until chains are complete. By favoring the opaque CL derivation over other valid chains, KI provides evidence for an active PREC constraint, defined in (17). This constraint requires that violations of MAX-C are preceded by violations of DEP-μ.

(17) PREC(DEP-μ, MAX-C): in the ordering of local unfaithful mappings (LUMS), MAX-C must be preceded and not followed by DEP-μ.

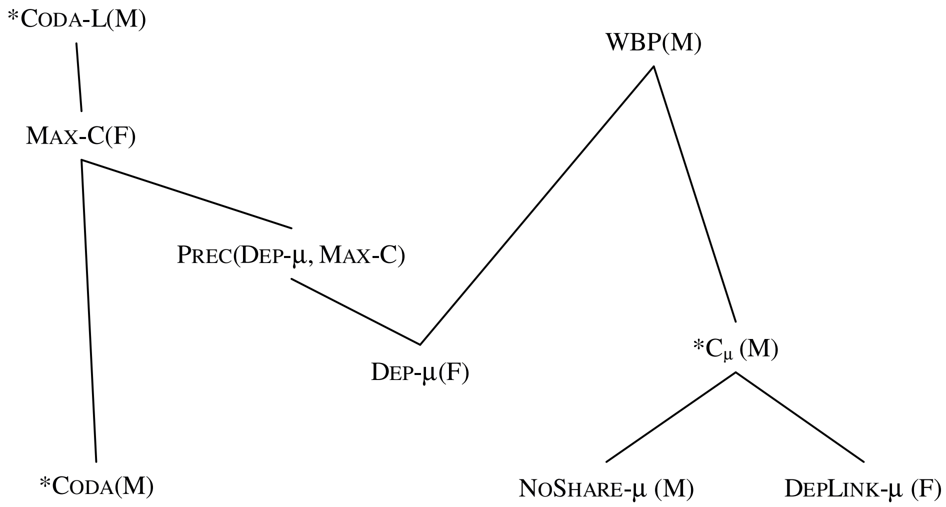
The ranking of the PREC constraint in (17) is fixed in part by logical argument, capsulated in a metaconstraint (McCarthy 2007a: 98-99), and in part by analytical necessity. The metaconstraint on PREC ranking given in (18) ensures that PREC constraints do not affect the violation of faithfulness constraints to which they refer. Thus, since violation of PREC(DEP-μ, MAX-C) entails a violation of MAX-C, PREC(DEP-μ, MAX-C) can only determine winners when MAX-C fails to.

(18) B >> PREC(A, B)

The side of the ranking argument contributed by analytic necessity brings us back to the specific case at hand. In KI CL, as well as in cases of counter-bleeding opacity generally, classic OT fails by selecting the more faithful candidate. Of the TLs in (16), classic "OT" prefers the TL in chain (c) to the TL in chain (b). This seems like a reasonable choice. Chain (b) has more violations of faithfulness (DEP-μ) and more violations of markedness (NOSHARED-μ). But the grammar of KI finds some redeeming value in chain (b). As if the additional constraint violations were for a noble cause, the grammar of KI selects (b). That is, there are two ways for a FFC of the form CVC to satisfy WBP—delete the Coda, leading to vacuous satisfaction, or insert a mora, meeting the structural requirement of the constraint. The PREC constraint in (17) functions in KI to penalize vacuous satisfaction of markedness by ranking PREC(DEP-μ, MAX-C) above DEP-μ.

The ranking of PREC(DEP-μ, MAX-C) between MAX-C and DEP-μ completes the grammar necessary to account for CL in KI. Before presenting Tableaus demonstrating this conclusion, the Hesse diagram in (19) summarizes the crucial rankings.

(19) Summary of rankings (M indicates Markedness; F indicates Faithfulness)



The comparative Tableau in (20) lists, for each valid candidate chain in (16), the information in the chain visible to EVAL, namely, the TL and the ordering of LUMs. The optimal candidate, or winner, is denoted by the right-pointing arrow, ‘→’, and losers are listed in (a), (c), (d) and (e). For each winner~loser comparison, constraints that favor the winner are marked with ‘W’; those that favor the loser are marked with ‘L’; and subscripts indicate the number of violation marks accrued for each constraint. The most interesting TLs are (b) and (c). Although DEP-μ favors the loser, it is ranked below PREC, which favors the winner. Since all constraints which favor losers are ranked below a constraint that favors the winner (there is a W to the left of every L), we can confirm that this ranking selects the CL candidate chain introduced in (8).

(20) Evaluation of valid chains in (23)

	/ ki$_{\mu}$lnɨ$_{\mu}$/	WBP	*CODA-L	MAX-C	PREC (DEP-μ, MAX-C)	DEP-μ
a.	< kɨ$_{\mu}$l$_{\mu}$.nɨ$_{\mu}$ > <DEP-μ>		W_1	L		
→ b.	< kɨ$_{\mu\mu}$.nɨ$_{\mu}$ > <DEP-μ, DEPLINK-μ, MAX-C>			1		1
c.	< kɨ$_{\mu}$.nɨ$_{\mu}$ > <MAX-C>			1	W_1	L
d.	< kɨ$_{\mu\mu 1}$l$_{\mu 1}$.nɨ$_{\mu}$ > <DEP-μ, DEPLINK-μ >		W_1	L		
e.	<kɨ$_{\mu}$l.nɨ$_{\mu}$> <>	W_1	W_1	L		L

5. Discussion

The Tableau in (20) demonstrates a solution to CL in KI that captures the intuition of mora preservation. There have been proposals for CL in versions of OT that maintain just two levels of representation which capitalize on different intuitions (e.g. CL as coalescence, Sumner 1999; CL as root node preservation, Hermans 2001) and accounts introducing enriched representations (Sprouse 1997, Goldrick 2001). The account here differs from these in a crucial way—it redefines the necessary and sufficient conditions for a synchronic CL process. In doing so, it makes a unique prediction about languages that have productive CL processes of the “classic” variety.

In an OT-CC grammar, the only languages that can have CL processes of the KI type are those that have moras which branch across vowel and Coda. This prediction follows from two facts: first, there is only one ranking of the constraints introduced in this paper, given in (22), that allows a valid CL candidate chain. Second, this ranking of CON favors the branching mora structure in (2) over the non-branching structure in (1). Thus, in a language with CL, any CVC syllable will share a second mora between the vowel and consonant. Although this prediction concerns a highly abstract structure, there is some evidence that it corresponds to concrete phonetic consequences. Broselow *et al.* (1997) demonstrate that vowels sharing moras, the precise structure required for our analysis of CL, are longer than vowels dominated by a single mora. Thus, the abstract structure required to do CL in OT-CC is physically manifested in the phonetic pattern of closed syllable lengthening.

One way to evaluate the novel prediction of OT-CC, then, is to look at the phonetic duration of closed syllables in KI. The prediction is that, all else equal, closed syllables will have longer vowels than open syllables. Since the typologically common pattern is closed syllable shortening (Maddieson 1985), the OT-CC prediction is betting against the odds. There are, however, several descriptions of this dialect of Komi that speak directly to this issue. Contrary to expectation, a number of researchers have noted closed-syllable lengthening in KI. Terent'ev (1970: 256) states that vowels lengthen before voiced stops and sonorants, and Sakharova and Sel'kov (1976: 13-15) add that vowels preceding voiceless stops can also lengthen. Igushev (1972: 55-57) further recognizes closed syllable lengthening; moreover., he demonstrates that the degree of lengthening in closed syllables is smaller than the degree of lengthening which accompanies *l*-deletion. Thus, several researches have reported phonetic lengthening of a non-standard variety in the direction predicted by OT-CC.

Although the phonetic evidence from KI seems to suggest that OT-CC may be on the right track, OT-CC's predictions regarding CL are not language specific. That is, since there is only one solution to this type of CL in the OT-CC framework, the predictions are not just that KI has closed syllable lengthening, but, in fact, that all languages with productive CL have closed syllable lengthening. This prediction offers a research strategy for identifying new cases of CL by directing attention to a specific subset of languages with weight-bearing Coda—those that share moras. At the same time, however, it invites known cases of productive CL to bear directly on evaluation of the theory.

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