Reduction and Syncope in Klamath Reduplication

Wendell A. Kimper // University of Massachusetts at Amherst
15th Manchester Phonology Meeting // May 25th, 2007

1 Introduction

- When a reduplicative prefix is present, a short vowel in the initial syllable of the base reduces to schwa or deletes entirely.
- Reduction occurs when the base vowel is in a closed syllable, while syncope occurs when the base vowel is in an open syllable:

(1) Reduction in Closed Syllables

a.	qlin	'choke'	sni-qlən	(causative)
b.	čonwa	'vomits'	hos-čənwa	(causative)
c.	pčin	'twist'	pči-pčən	(distributive)
d.	wejli	'lisps'	we-w'əjli	(distributive)

(2) Syncope in Open Syllables

a.	čmoga	'is dark'	sno-čm_ga	(causative)
b.	toq'a	'is scared'	hos-t_q'a	(causative)
c.	lt'oq'a	'thumps'	so-lt_q'a	(reflexive)
d.	paga	'barks'	pa-p_ga	(distributive)

- This process is limited prefixal reduplication; full-root reduplication does not trigger reduction or syncope, and long stem vowels are also exempt.
- Despite its regularity, there does not appear to be any underlying prosodic motivation.

(3) Syncope does not result in better syllable structure:

		faithful parse	*surface form*	
a.	/pa-paga/	*pa.pa.ga	pap.ga	'barks (distr.)'
b.	/q'a-q'aw'a/	*q'a.q'a.w'a	q'aq.w'a	'catches thrown objects (distr.)'

- A faithful parse of either of the examples above would result in a series of optimal CV syllables, but the actual surface forms each incur a violation of *Coda.
- There is little data available on Klamath metrical structure, but Cole (1997)'s analysis of the interaction of reduction and syncope and stress patterns yielded no consistent result for either primary or secondary stress.
- Klamath reduplicative reduction and syncope raises several important questions:

  i. Why does this process occur always and only with reduplication?

  ii. Why is the stem vowel always affected, and never the vowel in the reduplicant?

  iii. What factors govern the distribution of reduction and syncope in these forms?

- Section 2 will lay out the basic argument of an OCP-based approach to Klamath reduction and deletion, and Section 3 will discuss how weightless schwa and a ban on weightless syllables conspire to force syncope in open syllables. Section 4 will show how broad correspondence limits these effects to reduplicative environments,and Section 5 will show how positional faithfulness insures that the word-initial syllable preserves the input while the root deletes or reduces.

2 The OCP

- Reduplication is antithetical to the OCP — it demands repetition, which the OCP seeks to avoid.
  - Reduplicative reduction and syncope in Klamath represent a tension between the need for the reduplicative prefix to surface and the desire of the OCP to avoid repetition of adjacent elements.
- **Assumption**: The OCP is a primitive constraint. Alderete (1997) argues that it is instead the result of local conjunction.
- in Klamath, OCP effects are seen with every short vowel in the inventory. A local conjunction view of the OCP is inconsistent with Gouskova (2003)'s NoZero principle.

(4) Reduction and syncope occur with every short vowel in the inventory:

a. qniy'a	'has an erection'	sniqn_y'a	(causative)
b. p'etq'a	'blinks once'	sne-p'ətq'a	(causative)
c. sqasa	'is jealous'	sqa-sq_sa	(distributive)
d. poqč'a	'bulls/bends out of shape'	po-pəqč'a	(distributive)

- A primitive OCP constraint banning identity in adjacent vowels:

(5) OCP-V
Identical vowels in adjacent syllables are prohibited.

- OCP-V does not apply to vowel place identity between long and short vowels — these segments differ in length, and Klamath long vowels contrast systematically with short vowels in tenseness.
- OCP-V conflicts with a faithfulness constraint in the Max family (McCarthy and Prince, 1995) that requires vowel place identity:

(6) Max(VPlace)
Vowel place in S_1 must have a correspondent in S_2; if S_1 has vowel place features, then S_2 must also have vowel place features.

- This differs from the traditional conception of a Max constraint because it concerns a feature and not a segment or prosodic unit — this is necessary if we are to correctly distinguish between reduction and dissimilation in reduplicative environments.

- MAX(VPLACE) must be distinguished from IDENT(FEATURE) constraints, which require identity between features:

(7) IDENT(VPLACE)
Correspondent segments are identical in vowel place; if both S_1 and S_2 have vowel place features, they must be identical.

- IDENT(VPLACE) requires that the vowel place feature of one correspondent is identical to the vowel place feature of the other correspondent. In order for IDENT(VPLACE) to apply, both correspondent segments must have a vowel place feature.

- In order for reduction to occur, OCP-V must crucially dominate MAX(VPLACE): OCP-V ≫ MAX(VPLACE)

(8)

/sn{v}+qlin/	OCP-V	MAX(VPLACE)
a. sniqlin	*!	
b. ☞ sniqlən		*

- A candidate that satisfied OCP-V with dissimilation instead of reduction would also satisfy MAX(VPLACE), which only demands that the output correspondent must possess the feature of vowel place and does not require identity with the particular vowel place of the input.

- With MAX(VPLACE) alone, a candidate with a dissimilated vowel is incorrectly chosen over a candidate with a reduced vowel:

(9)

/sn{v}+qlin/	OCP-V	MAX(VPLACE)
a. sniqlin	*!	
b. sniqlən		*!
c. ☞ *sniqlan		

- With IDENT(VPLACE) alone, however, it is impossible to distinguish between the two because IDENT(VPLACE) must do the job of both constraints: a reduced vowel does not have a place feature identical to that of the input, and neither does a dissimilated vowel.

(10)

/sn{v}+qlin/	OCP-V	IDENT(VPLACE)
a. sniqlin	*!	
b. sniqlən		*
c. sniqlan		*

- With both MAX(VPLACE) and IDENT(VPLACE), it becomes possible to determine the correct output
  - There is division of labor between the two constraints, and IDENT(VPLACE) can apply specifically to vowels that have divergent place features, while MAX(VPLACE) applies when a vowel's correspondent has eliminated its place features entirely.

– To produce the kind of reduction displayed in Klamath reduplication, IDENT(VPLACE) must crucially dominate MAX(VPLACE): IDENT(VPLACE) ≫ MAX(VPLACE)

(11)

/sn{v}+qlin/	OCP-V	IDENT(VPLACE)	MAX(VPLACE)
a. sniqlin	*!		
b. sniqlan		*!	
c. ☞ sniqlən			*

3 Syncope: Weightless Schwa

- OCP-V is satisfied with either deletion or reduction, as both result in the elimination of identical features in adjacent vowels — reduction by eliminating vowel place and syncope by eliminating the entire segment.
- Both reduction and syncope will also violate MAX(VPLACE), because the vowel place features of the underlying segment are eliminated in either case:

(12)

/toq'+a/	OCP-V	MAX(VPLACE)
a. hostq'a		*
b. ☞ hostəq'a		*

- Reduction always occurs when the resulting syllable is closed, and syncope always occurs when the resulting syllable is open.[1]
  - Lapointe and Feinstein (1982) explain this as a prohibition of schwa in open syllables; schwa is not underlying in Klamath, and appears only in closed syllables either as the result of reduction or epenthesis.
- Kager (1990) suggests that in Dutch, the schwa does not always bear moraic weight.
  - A weightless schwa can be prevented from occurring in open syllables by a sufficiently high ranking of a constraint requiring syllables to contain at least one mora:

(13) *WEIGHTLESSσ
Every syllable must have at least one mora — no weightless syllables.

- Onsets do not contribute moraic weight, so in syllables lacking a Coda the peak is solely responsible for bearing the weight of the syllable. Syllables headed by weightless schwa, therefore, will have no moraic weight.
- In order for *WEIGHTLESSσ to force syncope, it must crucially dominate a segmental MAX constraint:

[1]Syncope does not occur, however, in open syllables of monosyllabic roots. In these cases, reduction occurs; pse is psepsə, not *pseps. I will not discuss this at length in this paper, but it can be assumed that the relevant prosodic restrictions are sufficiently highly ranked to prevent syncope in these cases.

(14) MAX-V
Every vowel in S_1 must have a correspondent in S_2.

- OCP-V must also rank above MAX-V; this ranking both permits and motivates syncope in cases where schwa would appear in a syllable with no coda, creating a weightless syllable:

(15)

/h{v}s+toq'+a/	*WEIGHTLESSσ	OCP-V	MAX-V
a. hostəq'a	*!		
b. hostoq'a		*!	
c. ☞ hostq'a			*

- In order to prevent dissimilation, IDENT(VPLACE) must be ranked above MAX-V: IDENT(VPLACE) ≫ MAX-V
- With this ranking, any candidate seeking to satisfy OCP-V and *WEIGHTLESSσ by dissimilation instead of syncope would be sub-optimal:

(16)

/h{v}s+toq'+a/	*WEIGHTLESSσ	OCP-V	IDENT(VPLACE)	MAX-V
a. hostəq'a	*!		*	
b. hostoq'a		*!		
c. hostaq'a			*!	
d. ☞ hostq'a				*

- With base vowels in closed syllables, *WEIGHTLESSσ does not have the opportunity to assign any violation marks, and is inactive. However, because MAX(VPLACE) is violated whenever MAX-V is, a candidate seeking to satisfy OCP-V by syncope in a closed syllable will be harmonically bounded.

(17)

/sn{v}+qlin/	OCP-V	MAX-V	MAX(VPLACE)
a. sniqlin	*!		
b. sniqln		*!	*
c. ☞ sniqlən			*

4 Broad Correspondence

- The constraint rankings established above make a far too powerful prediction. We expect to see syncope and reduction active wherever adjacent syllables contained identical vowels. However, this is not the case.

(18) **Adjacent identical vowels surface in non-reduplicative environhments**

a. sajaqa 'washes the hands'
b. č'ilwis 'boy (late teenage)'
c. loloqs[2] 'fire'
d. weget'as 'frog'

- The forms above should be unacceptable under the ranking established thus far:

(19)

/c'ilwi+s/	OCP-V	IDENT(VPLACE)	MAX-V	MAX(VPLACE)
a. č'ilwis	*!			
b. č'ilwas		*!		
c. č'ilws			*!	*
d. ☞ *č'ilwəs				*

(20)

/weget'+as/	*WEIGHTLESSσ	OCP-V	IDENT(VPLACE)	Max-V
a. wegət'as	*!			
b. weget'as		*!		
c. wegot'as			*!	*
d. ☞ *wegt'as				*

- It is necessary to restrict OCP effects to reduplicative environments. Cole (1997) discusses this restriction in terms of recoverability.
  - Reduplicated vowels have a unique opportunity to violate faithfulness and identity because they are recoverable, because the original features of the base vowel can be deduced from its correspondent in the reduplicant.
- Struijke (1998, 2000) suggests that the goal of the Input-Output correspondence relationship is not identity but preservation of underlying material.
- The generalization that Klamath vowels are permitted to reduce or delete only in reduplicative environments can be explained with broad correspondence (Struijke, 1998), which requires only that each segment of the input must appear *somewhere* in the output.
- Faithfulness constraints, then, are existentially defined:

(21) Existential Faithfulness (Struijke, 2000)
$\exists$-MAX$_{IO}$
Every segment in the Input has some correspondent in the Output.
$\exists$-IDENT(F)$_{IO}$
Some Output segment corresponding to an Input segment preserves the feature specification of that Input segment.

- Broad correspondence specifically applies to the Input-Output domain.
  - In non-reduplicative environments, the existentially-defined broad correspondents constraints manifest as a traditional correspondence relationship.

[2]Barker (1963) notes that this could possibly be reduplicative, but that there is no distributive or other such meaning attached to this form to suggest the presence of a reduplicative prefix.

- In reduplicative environments, input segments have multiple correspondents, and two chances to satisfy faithfulness.

(22) Non-reduplication and Reduplicative Correspondence

a.	$\check{c}'_1$	i_2	l_3	w_3	i_4	s_5		b.			p_1	a_2	g_3	a_4
	$\check{c}'_1$	i_2	l_3	w_3	i_4	s_5			p_1	a_2	p_1	a_2	g_3	a_4

- Each reduplicated segment essentially has two correspondents in the output; when one deletes, the other can still satisfy broad correspondence.

(23) Syncope in Reduplication: features are preserved

		p_1	a_2	g_3	a_4
p_1	a_2	p_1	-	g_3	a_4

- The relevant faithfulness constraints for this analysis of Klamath reduction and syncope, existentially defined:

(24) Existential Faithfulness in Klamath Reduplication
∃-MAX-V_{IO}
Each vowel in the Input has some correspondent in the Output.
∃-MAX(VPLACE)$_{IO}$
Each vowel place feature in the Input as some correspondent in the Output.
∃-IDENT(VPLACE)$_{IO}$
Some Output segment corresponding to an Input segment preserves the vowel place of that input segment.

- These are very high-ranking constraints, and must crucially dominate OCP-V: ∃-MAX-V_{IO}, ∃-MAX(VPLACE)$_{IO}$, ∃-IDENT(VPLACE)$_{IO}$ $\gg$ OCP-V
- In non-reduplicative environments, the optimal candidate will violate the OCP to preserve the input:

(25)

/č'ilwi+s/	∃-MAX-V_{IO}	∃-MAX(VPLACE)$_{IO}$	∃-ID(VPLACE)$_{IO}$	OCP-V
a. č'ilws	*!			
b. č'ilwəs		*!		
c. č'ilwas			*!	
d. ☞ č'ilwis				*

- In a reduplicative context, this same ranking permits OCP-V to force reduction or syncope:

(26)

/sn{v}+qlin/	∃-MAX-V_{IO}	∃-MAX(VPLACE)$_{IO}$	∃-ID(VPLACE)$_{IO}$	OCP-V
a. sniqlin				*!
b. sniqln				
c. sniqlən				
d. sniqlan				

- These constraints, however, cannot differentiate between the various candidates that satisfy OCP-V. For that, we need to turn to Base-Reduplicant correspondence and faithfulness constraints that are not existentially defined.

- Broad correspondence only applies to the Input-Output domain. Base-Reduplicant identity can be used here to choose between syncope, reduction, and dissimilation in reduplicative candidates that satisfy OCP-V:

(27) Base-Reduplicant Identity in Klamath
MAX-V_{BR}
Each vowel in the Base has a correspondent in the Reduplicant.
MAX(VPLACE)$_{BR}$
Each vowel place feature in the Base has a correspondent in the Reduplicant.
IDENT(VPLACE)$_{BR}$
Correspondent segments in the base and reduplicant are identical in vowel place.

- These BR-specific constraints maintain the rankings of their more general counterparts in §2 and §3: OCP-V, IDENT(VPLACE)$_{BR}$ ≫ MAX-V_{BR} ≫ MAX(VPLACE)$_{BR}$

- With this ranking, it is once again possible to distinguish between reduction, syncope, and dissimilation. When base vowels are in closed syllables, and *WEIGHTLESSσ is not active, reduction will be the optimal choice:

(28)

/sn{v}+qlin/	OCP-V	IDENT(VPLACE)$_{BR}$	MAX-V_{BR}	MAX(VPLACE)$_{BR}$
a. sniqlin	*!			
b. sniqlan		*!		
c. sniqln			*!	
d. ☞ sniqlən				*

- When the base vowel would be in an open syllable and *WEIGHTLESSσ has an opportunity to become active, syncope will be the preferred choice:

(29)

/h{v}s+toq'+a/	*WEIGHTLESSσ	OCP-V	IDENT(VPLACE)$_{BR}$	MAX-V_{BR}
a. hostəq'a	*!			
b. hostoq'a		*!		
c. hostaq'a			*!	
d. ☞ hostq'a				*

5 Positional Faithfulness

- In the reduplicative environments outlined thus far, multiple vowels are candidates for reduction or syncope to satisfy OCP-V: the vowel in the base and the vowel in the reduplicant.

- Invariably, it is the vowel in the base which is affected, and the vowel in the reduplicant preserves the features of the input.

- The faithfulness rankings we have currently established are unable to make this distinction.
  - Base-Reduplicant correspondence is equally violated by unfaithfulness in either the base or the reduplicant
  - Broad correspondence is not violated at all so long as at least one copy of the vowel remains.

- In prefixes with fixed coda material, in fact, the vowel in the reduplicant would be a more optimal choice — syncope would never be forced by *WEIGHTLESSσ, and a MAX-V_{BR} violation would be spared in favor of a violation of the lower-ranked MAX(VPLACE)$_{BR}$.

- Markedness explanations are not sufficient to explain why absolutely every form displaying reduplicative reduction and syncope does so in the base and not the reduplicant.
  - Reduction and syncope occurs with a broad range of syllable structures, and it's unlikely that every configuration is improved by deleting the base vowel.
  - There is insufficient data on Klamath stress to entirely rule out a prosodic motivation, but it would also be unlikely that in absolutely every case the prosodic structure is improved by deleting the base vowel instead of the reduplicant.
  - An analysis based on either syllabic or prosodic markedness would ultimately require some kind of Output-Output Correspondence or Optimal Paradigm (McCarthy, 2005) restrictions to insure sufficient regularity.

- **Positional faithfulness** (Beckman, 1998) provides additional strength for faithfulness restrictions in prominent positions. Root-initial syllables are prominent, and call for additional faithfulness:

  (30) Root-Initial Faithfulness (Beckman, 1998)
  IDENTσ_1(F)
  An Output segment in σ_1 [of the root] and the Input correspondent of that segment must have identical feature specifications.

- Positional prominence is especially important within the context of broad correspondence and recoverability; when a vowel is in a prominent position, it is better suited to carry the features of the input, because its features are more likely to be easily perceived and interpreted than the features of a vowel in a less prominent position.

- (Smith, 2002) suggests that the relevant initial syllable is word-initial, and that root faithfulness is distinct from initial-syllable faithfulness. She argues that word-initial syllables play an important role in early-stage word recognition, and are therefore particularly salient.

- In Klamath, it is the word-initial syllable that retains the underlying features of the reduplicated vowel. It is the word-initial syllable, not the root-initial syllable, whose prominence is relevant to positional faithfulness:

(31) Word-Initial Faithfulness in Klamath Reduplication
Maxσ_1-V
In a word-initial syllable, every vowel in S_1 must have a correspondent in S_2.
Maxσ_1(VPlace)
In a word-initial syllable, vowel place in S_1 must have a correspondent in S_2.
Identσ_1(VPlace)
In a word-initial syllable, a vowel and its correspondent must be identical in place.

- It is necessary here that the positional faithfulness constraints specific to word-initial syllables crucially dominate their counterpart constraints specific to root vowels.
- This ranking insures that the vowel place features of the word-initial syllable (in the reduplicant) will be preserved, at the expense of the vowel place features in the root syllable (in the base):

(32)

/h{v}s+čonw+a/	OCP-V	Maxσ_1(VPlace)	Max(VPlace)$_{RT}$
a. hosčonwa	*!		
b. həsčonwa		*!	
c. ☞ hosčənwa			*

- Broad correspondence will be satisfied by preservation of input material in the word-initial syllable — the reduplicant — and OCP-V will be satisfied by unfaithfulness in the base, despite its prominence as the root.

6 Conclusion

- This paper has sought to answer several important questions about reduplicative reduction and syncope in Klamath:
  i. Why does this process occur always and only with reduplication?
  ii. Why is the stem vowel always affected, and never the vowel in the reduplicant?
  iii. What factors govern the distribution of reduction and syncope in these forms?
- Question (i.) was answered by an account of reduplicative reduction and syncope motivated by the OCP, and restricted to reduplicative environments by existentially-defined correspondence.
- Question (ii.) was answered by an account based on positional faithfulness.
- Question (iii.) was answered by the potential weightlessness of schwa, combined with a prohibition on weightless syllables.

References

Alderete, John. 1997. Dissimilation as local conjunction. In *Proceedings of the Northeast Linguistics Society*, ed. Kiyomi Kusumoto, volume 27, 17–32.

Barker, M.A.R. 1963. *Klamath dictionary*, volume 32 of *Publications in Linguistics*. University of California.

Beckman, Jill. 1998. Positional faithfulness. Doctoral Dissertation, University of Massachusetts, Amherst.

Cole, Jennifer. 1997. Deletion and recoverability in klamath. University of Illinois.

Gouskova, Maria. 2003. Deriving economy: Syncope in optimality theory. Doctoral Dissertation, University of Massachusetts, Amherst.

Kager, René. 1990. Dutch schwa in moraic phonology. In *Papers from the 26th Regional Meeting of the Chicago Linguistic Society.*, volume 2, 241–255.

Lapointe, Steven G., and Mark H. Feinstein. 1982. The role of vowel deletion and epenthesis in the assignment of syllable structure. In *The structure of phonological representations*, ed. Harry van der Hulst and Norval Smith, volume II. Foris.

McCarthy, John. 2005. Optimal paradigms. In *Paradigms in phonological theory*, ed. Laura Downing, Tracy Alan Hall, and Renate Raffelsiefen, 170–210. Oxford University Press.

McCarthy, John, and Alan Prince. 1995. Faithfulness and reduplicative identity. In *University of massachusetts occasional papers in linguistics 18: Papers in optimality theory*, ed. Jill Beckman, Suzanne Urbanczyk, and Laura Walsh Dickey, 249–384. University of Massachusetts.

Smith, Jennifer. 2002. Phonological augmentation in prominent positions. Doctoral Dissertation, University of Massachusetts, Amherst.

Struijke, Caro. 1998. Reduplicant and output tetu in kwakwala: A new model of correspondence. *University of Maryland Working Papers in Linguistics* 7:150–178.

Struijke, Caro. 2000. Existential faithfulness: A study of reduplicative tetu, feature movement, and dissimilation. Doctoral Dissertation, University of Maryland, College Park.