Explaining Kashaya Infixation

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In this paper I show that, as in languages like Tagalog, the position of infixes in Kashaya (a Pomoan language of northern California) is subordinate to surface phonological well-formedness. What distinguishes Kashaya from more typical examples of this sort is that infixation occurs for featural, rather than strictly syllabic, reasons: to improve the featural content of the coda, and to prevent the deletion of distinctive features. In both cases, coronal consonants behave as special relative to labials and dorsals.

I begin in §1 by outlining the basic approach established in Optimality Theory for the Tagalog pattern. After introducing the Kashaya 'Plural Act' morpheme in §2 and its vowel-initial allomorphs in §3, which are always suffixed, I move on to its infixed allomorphs: *-ta-* which is sometimes infixed (§4), and *-t-* which is always infixed before a root-final consonant (§5). I show in §6 that the proposed analysis also accounts for the non-infixation of other consonant-initial allomorphs, and give in §7 a brief conclusion.[*]

1. Prosodic Infixation: Tagalog

One of the most striking types of evidence in favor of the ranked and violable surface constraints of Optimality Theory is the elegant account they provide for prosodically motivated infixation (Prince and Smolensky 1993: 33f). A classic example is Tagalog 'actor focus' *-um-*, which occurs after the initial consonant(s) of a word (Schachter and Otanes 1972: 292, French 1988).

(1) a. `abot`   **um**-`abot`   'reach for'
     b. `tawag`   `t-`**um**-`awag`   'call'
     c. `sulat`   `s-`**um**-`ulat`   'write'
     d. `gradwet`   `gr-`**um**-`adwet`   'graduate'

A derivational analysis can formalize this generalization by means of prosodic circumscription (McCarthy and Prince 1986, 1990): the onset (possibly null) is set aside, *um-* is prefixed, then the onset is restored.

(2) a. *Circumscribe onset*   `(gr)`   `adwet`
     b. *Prefix um-*   `um-adwet`
     c. *Restore onset*   `gr-um-adwet`

The fundamental problem with such an approach is that it fails to relate the form of the infix to its positional properties. For example, why aren't there any CV infixes which occur after the onset? The obvious answer, long recognized, is that infixation of a VC prefix results in a better syllable structure by avoiding codas (Anderson 1972: 259), while a CV infix would produce a complex onset and two vowels in hiatus: cf. *ma-tulog* 'sleep', not **t-ma-ulog*.

Optimality Theory, with its focus on the surface form of output candidates, provides the tools to formalize this intuition. In Tagalog and similar languages, a syllable structure requirement outranks a constraint identifying the morpheme as a prefix (Prince and Smolensky 1993).

(3) a. NOCODA   Syllables do not have codas.
         ALIGNL-*um* The morpheme *um* aligns with the left edge of the stem.

    b. NOCODA » ALIGNL-*um*

Because of the ranking in (b), alignment (i.e. status as a prefix) is sacrificed to syllabic well-formedness, but only minimally; the infix remains as close to the left edge as possible without creating a new coda.

(4)

		NOCODA	ALIGNL-*um*
a.	**um**.ta.wag	**!	
b. ☞	tu.**ma**.wag	*	*
c.	ta.w**u**.mag	*	**!*

I show below that the complex facts of infixation in Kashaya must also be explained in terms of surface well-formedness. The optimal position of the affix — either as a simple suffix, or before the final consonant of the stem — depends on independent featural processes, a fact captured by comparing alternative surface representations.

2. The Plural Act in Kashaya

The Kashaya 'Plural Act' verb marker indicates that 'the act is plural, either because the object that is undergoing the action is plural or because the act is performed on the same object more than once' (Oswalt 1961:168).

(5) a. dacʰa-   'grab a single object once'
    b. dacʰa-**t**-   'grab several objects' *or* 'grab one object several times'

This affix has a number of allomorphs (Oswalt 1961, Buckley 1994), determined partly by the final segment of the verb root and partly by arbitrary lexical choice. For example, while *-aq* occurs only after /l/, several other suffixes are possible there; for any verb ending in /l/ the choice of suffix must be lexically specified.[1]

(6)   *Root*   *Plural Act*
    a. -bil-   -bil-ta-
    b. -hal-   -hal-at-
    c. -ʔǩol-   -ʔǩol-aq-

Some of the allomorphs are always suffixed, but two are also infixed. My concern here is, given a particular allomorph and root, how do we predict whether or not infixation occurs? I show that once the grammar is properly understood, no stipulation as to position is necessary (though some lexical stipulation of allomorph choice is unavoidable).

3. Vowel-initial suffixes

As noted, some allomorphs of the Plural Act are always suffixed, and never occur as infixes. This includes the vowel-initial allomorphs *-at* and *-aq*, which appear only after consonant-final roots — specifically, after /l, n/ only.[2]

(7) a. dahal-   dahal-**at**-   'dig (hole)'
     b. qahpʰul-   qahpʰul-**at**-   'winnow'
     c. ċihwin-   ċihwin-**at**-   'get red-hot'
     d. šuhwe:n-   šuhwe:n-**at**-   'shake'

(8) a. diʔǩol-   diʔǩol-**aq**-   'prune (branch)'
     b. bahcʰital-   bacʰital-**aq**-   'string (batch of meat)'
     c. muhkul-   muhkul-**aq**-   'cook'

There is a simple prosodic explanation for this generalization. Just as a CV prefix would never be infixed after the onset, so infixation of a VC suffix before the last consonant merely produces vowel and consonant clusters, e.g. *daha-**at**-l-. There is no syllabic motivation for violating right alignment (9), and in fact that would introduce a violation of ONSET.

(9) ALIGNR   The Plural Act morpheme aligns with the right edge of the root.
     ONSET   Syllables have onsets.

(10)

		ONSET	ALIGNR
a. ☞	da.ha.l**a**.t		
b.	da.ha.**at**.l	*!	*
c.	da.h**a**.**ta**.l		*!*

While the constraint ranking NOCODA » ALIGNR would produce the same result, we see below that this ranking cannot hold (e.g. (15)). ONSET, however, is un-dominated (i.e. never violated) in Kashaya.

4. Infixation of *-ta-*

The central goal of this paper is to account for two allomorphs, *-ta-* and *-t-*, which can occur as infixes. First consider *-ta-*. It is suffixed when the verb ends in one of the consonants /l, n, ṅ, ċ/.

(11) a. dahqoṭol-   dahqoṭol-**ta**-   'fail (to do)'
     b. diṭan-   diṭan-**ta**-   'bruise by dropping'
     c. duhluṅ-   duluṅ-**ta**-   [duluʔ**ta**-]   'pick (berries)'
     d. dayeċ-   dayeċ-**ta**-   [dayeʔ**ta**-]   'press hand against'

It is infixed, however, when the final consonant is /m, q, qʷ, c/.

(12) a. bilaqʰam-   bilaqʰa-**ta**-m-   'feed'
     b. sima:q-   sima-**ta**-q-   'go to sleep'
     c. qašo:qʷ-   qašo-**ta**-qʷ-   'get well'
     d. duqa:c-   duqa-**ta**-c-   'get lost'

The basic generalization is that we find suffixation after a coronal, otherwise infixation. (I return to the question of plain palato-alveolar /c/ below.) Buckley (1994: 350) analyzes this pattern using prosodic circumscription as in (2), and has to stipulate the consonants which are set aside before suffixation. A more explan-atory approach, as with Tagalog, is to compare surface forms which would result from the alternatives of suffixation and infixation. The question is why for the roots in (11) the coda is permitted, while for those in (12) infixation is preferred.

4.1. Markedness of codas

It is well known that coronal consonants often behave as less marked relative to other places of articulation (cf. Paradis and Prunet 1991). This lower markedness holds also for coda position specifically; for example, in Lardil the only codas permitted are coronals (excluding cases of shared place features; see Hale 1973, Wilkinson 1988, Prince and Smolensky 1993). In Kashaya, we can conclude that non-coronal codas are permitted but still disfavored: infixation is employed in (12) to avoid creation of a labial or dorsal coda.

Following Prince and Smolensky (1993) and Smolensky (1993), a positive harmonic scale (13) can be converted into ranked negative constraints as in (14).[3]

(13)   Cor]$_\sigma$ ≻ Lab]$_\sigma$ ≻ Dor]$_\sigma$

(14)   *DOR]$_\sigma$ » *LAB]$_\sigma$ » *COR]$_\sigma$

Since the placement of the Plural Act distinguishes between coronals and other consonants, it follows that ALIGNR is ranked as shown in (15). (In Lardil, MAX occupies the same position; cf. Smolensky 1993.) With this ranking, infixation occurs to avoid a dorsal or labial coda, but not to avoid a coronal coda.[4]

(15)

	*DOR]$_\sigma$	*LAB]$_\sigma$	ALIGNR	*COR]$_\sigma$
a. ☞ di.ṭan.**ta**				*
b. di.ṭa.**ta**.n			*!	
c. bi.la.qʰam.**ta**		*!		
d. ☞ bi.la.qʰa.**ta**.m			*	

In tableaux here, I treat the final consonant in these incomplete forms as an onset, since a following vowel-initial suffix can be assumed. In the complementary context, i.e. with a consonant-initial suffix, paradigm uniformity requires that the affix occupy the same position (cf. Kenstowicz 1995).

These examples show that infixation of *-ta* occurs in order to preserve non-coronal features in the root-final consonant.

4.2. Uvular debuccalization

A complication arises in the case of uvular-final stems. By regular process, a uvular stop in the coda loses its place features, so that underlying /q, qʷ/ becomes [h]. The following plain suffixes illustrate this.

(16) a. ʔusaq-wa   →   ʔusa<u>h</u>wa   'did he wash his face?'
     b. sima:q-meʔ   →   sima<u>h</u>meʔ   'go to sleep!'
     c. qašo:qʷ-tʰ   →   qašo<u>h</u>tʰ   'he isn't getting well'

I attribute this deletion of features — rather than the entire segment — to the ranking MAX » *DOR]$_\sigma$ » IDENT(Dor). For precise definitions of the correspondence constraints in (17), see McCarthy and Prince (1995: 264).

(17) MAX   Do not delete a segment.
     IDENT(F)   Do not change the value of feature F of a segment.

That the stop surfaces as [h] rather than [ʔ] indicates the latter is disfavored, at least in the coda. As in (14), harmonic h]$_\sigma$ ≻ ʔ]$_\sigma$ translates to *ʔ]$_\sigma$ » *h]$_\sigma$.

(18)

		MAX	*DOR]$_\sigma$	IDENT(Dor)	*ʔ]$_\sigma$	*h]$_\sigma$
a.	ʔu.saq.wa		*!			
b.	ʔu.saʔ.wa			*	*!	
c. ☞	ʔu.sah.wa			*		*
d.	ʔu.sa.wa	*!				

The same process should be expected for the uvular-final stems in (12). That is, while a candidate such as *simaq-**ta**- is ruled out by *DOR]$_\sigma$ » ALIGNR, parallel to the labial in (15), we must also consider the alternate candidate *simah-**ta**-.

(19)

		*DOR]$_\sigma$	IDENT(Dor)	ALIGNR
a.	si.maq.**ta**	*!		
b.	si.mah.**ta**		*!	
c. ☞	si.ma.**ta**.q			*

Here infixation actually occurs to avoid the loss of place features, rather than to avoid a dorsal coda. The overall generalization remains the same, namely that Kashaya infixation is determined by featural preferences, rather than simple syllable structure.

4.3. Coronal debuccalization

As indicated in (11), glottalized coronals undergo another type of debuccalization before a coronal, losing Place to become [ʔ]. This process is quite regular, and is found with plain suffixes as well.

(20) a. mo–aṅ–še   →   moʔše   'I wonder if he is running'
      b. mahsaṅ–tʰ   →   mahsaʔtʰ   'he isn't taking it away'
      c. du:ciċ–cʰi   →   du:ciʔcʰi   'if he knows'
      d. šubiliċ–do   →   šubiliʔdo   'they say it blazed up'

Assume that the basic motivation for debuccalization is the Obligatory Contour Principle, ruling out two adjacent coronal features (cf. McCarthy 1986, Yip 1988).

(21)   OCP-Cor   Adjacent [Coronal] features are prohibited.

This constraint dominates IDENT(Cor) to force deletion of the Coronal feature.[5] By contrast, IDENT(Lar) dominates *ʔ]$_\sigma$ to ensure survival of that feature.

(22)

		OCP-Cor	IDENT(Cor)	IDENT(Lar)	*ʔ]$_\sigma$
a.	moṅ.še	*!			
b.	moh.še		*	*!	
c. ☞	moʔ.še		*		*

With a potential infix, right-alignment is sacrificed to preserve Dorsal (12), but not Coronal (11). This is another example of the vulnerability of coronals, and can be captured by the following ranking (cf. (15)).

(23)   IDENT(Dor) » ALIGNR » IDENT(Cor)

(24)

		OCP-Cor	ALIGNR	IDENT(Cor)
a.	du.luṅ.**ta**	*!		
b. ☞	du.luʔ.**ta**			*
c.	du.lu.**ta**.ṅ		*!	

For uvulars, ALIGNR is ranked below IDENT, and suffixal status is sacrificed to preserve consonant features, in this case Dorsal (19). The feature Coronal, however, is less highly valued and it is simply deleted to preserve alignment (24).

4.4. Special status of /c/

A similar but more extreme process explains the apparently exceptional nature of /c/, with infixation in *duqa-**ta**-c-* (12d) unlike the suffixation found with the other coronals (11). The alternative candidate **duqac-**ta*** ought to be optimal, but independently, a /c/ before a coronal loses its segmental status, with compensatory lengthening of the preceding vowel. This is illustrated first with plain suffixes.

(25) a. yoǧoc-tʰ   →   yoǧo:tʰ   'he isn't keeping it'
      b. ṡuwac-ti   →   ṡuwa:ti   'in order to dry'
      c. ṡuwac-še   →   ṡuwa:še   'I wonder if it got dry'

For present purposes I attribute this change to OCP-Cor as well, but space limitations prevent exploring the varied effects of the constraint.[6]

(26)

		OCP-Cor	MAX
a.	ṡu.wac.ti	*!	
b. ☞	ṡu.wa:.ti		*

Given this pattern, the real alternative to *duqa-**ta**-c-* is **duqa:-**ta***, with loss of the segment in violation of MAX. What we find is infixation to prevent loss of the /c/, indicating MAX » ALIGNR.

(27)

		OCP-Cor	MAX	ALIGNR
a.	du.qac.**ta**	*!		
b.	du.qa:.**ta**		*!	
c. ☞	du.qa.**ta**.c			*

In sum, Kashaya differs from Tagalog because the presence of just any coda is insufficient to cause infixation. What dominates ALIGN is a set of featural constraints — regarding distribution and faithfulness — rather than a simple syllable structure constraint like NOCODA.

5. Infixation of *-t-*

The second infixable allomorph, *-t-*, occurs as a suffix after a vowel, as expected.

(28) a. qawa–   qawa-**t**–   'chew'
     b. siṡa–   siṡa-**t**–   'leach'
     c. pihmi–   pimi-**t**–   'see in detail'

What makes this allomorph particularly interesting is that it is always infixed before a consonant; but there are two distinct subcases. It occurs as infixed [t] when the stem-final consonant is noncoronal. (All plain stops are aspirated in the coda, so it becomes more specifically [tʰ].)

(29) a. pʰanem–   pʰane-**t**-m–   [pʰanetʰm-]   'hit with the fist'
     b. pʰiʔya:q–   pʰiya-**t**-q–   [pʰiyatʰq-]   'recognize'
     c. pʰaċo:qʷ–   pʰaċo-**t**-qʷ–   [pʰaċotʰqʷ-]   'stab'

When the stem ends in a coronal, *-t-* is infixed and surfaces as [h]. Here /c/ is not special: all coronals induce infixation.

(30) a. šuṫat–   šuṫa-**h**-t–   'twist'
     b. sihwaṫ–   siwa-**h**-ṫ–   'sag from being wet'
     c. cubuš–   cubu-**h**-š–   'sprout'
     d. kel–   ke-**h**-l–   'peer'
     e. tubic–   tubi-**h**-c–   'get up'

The fact that /t/ surfaces as [h] before another coronal is due to the same debuccalization illustrated with glottalized coronals in (20). Plain suffixes are given first.

(31) a. dali:t-tʰ   →   dali<u>ht</u>ʰ   'he isn't waving his hand'
     b. libut-ti   →   libu<u>ht</u>i   'in order to whistle'
     c. šoyot-še   →   šoyo<u>hš</u>e   'I wonder if it's overflowing'
     d. qapʰut-y   →   qapʰu<u>hy</u>   'I just saw him spit'

The essential analysis has been given already for /q/ in (18): plain obstruents debuccalize to [h].

(32)

		MAX	OCP-Cor	IDENT(Cor)	*ʔ]σ	*h]σ
a.	li.but.ti		*!			
b. ☞	li.buh.ti			*		*
c.	li.buʔ.ti			*	*!	
d.	li.bu.ti	*!				

Taking this effect into account, we see that the constraints proposed above also account for the data in (29) and (30). Note that /t/ does not gratuitously become [h] in the coda, due to faithfulness (33d).

(33)

		IDENT(Lab)	*LAB]$_\sigma$	ALIGNR	IDENT(Cor)
a.	pʰa.nem.**t**		*!		
b.	pʰa.neh.**t**	*!			
c. ☞	pʰa.net.**m**			*	
d.	pʰa.neh.**m**			*	*!

But /t/ becomes [h] when necessary to satisfy OCP-Cor, which is highly ranked.

(34)

		OCP-Cor	ALIGNR	IDENT(Cor)	*COR]$_\sigma$
a.	kel.**t**	*!			*
b.	ket.**l**	*!	*		*
c. ☞	keh.**l**		*	*	

Infixation in *pʰane-**t**-m-* is expected since it avoids the labial coda in **pʰanem-**t**-*. But debuccalization is necessary to explain why infixation also occurs in *ke-**h**-l-*. If we had to choose between *kel-**t**-* and *ke-**t**-l-* 'before' debuccalization, we would wrongly choose well-aligned **kel-**t**-*, since the two forms both present a coronal cluster. It is crucial, then, that the surface forms be compared.[7]

    Finally, while /q/ often becomes [h] in other contexts (16), this loss of place features is disfavored by IDENT; when infixation can prevent such neutralization, alignment is sacrificed.

(35)

		*DOR]$_\sigma$	IDENT(Dor)	ALIGNR	IDENT(Cor)
a.	pʰi.yaq.**t**	*!			
b.	pʰi.yah.**t**		*!		*
c. ☞	pʰi.yat.**q**			*	
d.	pʰi.yah.**q**			*	*!

The motivation for this infixation is the same as for *sima-ta-q-* in (19).[8]

6. Consonant-initial suffixes

In addition to the vowel-initial allomorphs in §3 which are simple suffixes, there are also three consonant-initial allomorphs which, unlike *-ta-* and *-t-*, are never infixed. I show in this section that the existing analysis predicts this fact. The first suffix is *-w*, whose position has a trivial explanation: this allomorph combines only with vowel-final roots.

(36) a. pihti-   pihti-**w**-   'chip with an ax'
     b. qawi:-   qawi-**w**-   'build (house)'
     c. cise-   cihse-**w**-   'mop (room)'

In this post-vocalic position, there is no prosodic motivation for infixation: it would only worsen the syllable structure (e.g. **piht-**w**-i-*).
    A second suffix-only allomorph consisting of a single consonant is *-m*, which has a wider context of occurrence than *-w*. It appears after vowel-final stems, as well as after stems ending in the coronal sonorants /l, n/.

(37) a. baqʰa:-   baqʰa-**m**-   'finish'
     b. tolotolo-   tolotolo-**m**-   'have clear true voice'
     c. baʔt̓il-   baʔt̓il-**m**-   'be too noisy'
     d. šuhwe:n-   šuhwe:n-**m**-   'shake'

Once again there is no prosodic motivation for infixation. After a vowel, the situation is the same as for *-w* (36). After a consonant, a cluster results whether or not the /m/ is infixed. Violation of ALIGNR leads to a disfavored labial coda, so suffixation is preferred (i.e. for the same reason we find **infixation** in *pʰane-**t**-m-*).

(38)

	*LAB]$_\sigma$	ALIGNR	*COR]$_\sigma$
a. ☞ baʔ.t̓il.**m**			*
b. baʔ.t̓i**m**.l	*!	*	

The last consonant-initial allomorph which is always suffixed, *-ʔta*, begins with a two-consonant cluster. Crucially, however, the first consonant is a laryngeal, which by general process in Kashaya merges into a single segment with a preceding (compatible) consonant (Buckley 1994: 68). Specifically, this suffix occurs only after /y/, which merges with /ʔ/ to form glottalized [ẏ].[9]

(39) a. duhtay-   dutay-**ʔta**-   [dutaẏta-]   'touch'
     b. muhkʰuy-   mukʰuy-**ʔta**-   [mukʰuẏta-]   'burn up'

Because of this independent phenomenon of Glottal Merger — which can be motivated by DEP ('Do not insert a segment') together with other constraints — the actual outputs reduce the cluster /yʔt/ to [ẏt].

(40)

	DEP	ALIGNR	*COR]$_\sigma$	*ʔ]$_\sigma$
a. du.tay.**ʔi̱.ta**	*!		*	
b. ☞ du.taẏ.**ta**			*	
c. du.ta**ʔ.ta**.y		*!		*

The outcome here is very much like that for plain *-ta* after coronals as shown in (11), such as *dit̓an-ta-*. It also raises an issue which is relevant to those forms as well: shouldn't the ranking OCP-Cor » ALIGNR favor infixation as in (40c)? This expectation relies on the assumption that the OCP objects only to adjacent coronals, but I argue that this is not the case.

We have seen that, of the Plural Act allomorphs which contain a coronal, only *-t-* is infixed before another coronal. The coronal in this form is also the only one which would become [h] in that context; when a vowel follows the coronal within the suffix, as in *-ta* and *-ʔta*, the /t/ surfaces in the onset and no debuccalization is possible. In other words, infixation occurs only when it will result in debuccalization. It is the loss of place features, and not the mere movement of the consonant, which eliminates the OCP violation. This indicates that infixation in a candidate such as **dit̓a-**ta**-n-* has no effect on whether the /t/ of the affix and the final /n/ of the root stand in violation of OCP-Cor; the intervening vowel, which has no consonantal place features, is transparent for purposes of determining whether two adjacent coronals exist. This is quite similar to the situation in Semitic, where restrictions on same-place consonants in the root are unaffected by the fact that realization of the root in a templatic pattern introduces intervening vowels (see

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McCarthy 1986, Pierrehumbert 1989). The same cross-vowel violation will hold of other coronals in the representation, but when they occur in the onset, or when they are plain sonorants, debuccalization is independently prevented.

(41)

	OCP-Cor	ALIGNR	*COR]$_\sigma$
a. ☞ di.ṭan.**ta**	***		*
b. di.ṭa.**ta**.n	***	*!	

Similarly, (40a,b) have an equal number of coronals, and OCP-Cor does not distinguish them; the decision falls instead to ALIGNR, which prefers suffixation.[10] It is only in a form like *ke-h-l-* (34), where infixation leads to the actual **loss** of a coronal feature, that an OCP violation (found in the candidate **kel-t-*) is eliminated, and infixation thus favored.

An important further issue is why, if the OCP ignores intervening vowels, debuccalization itself does not occur in a form like *pʰane-t-m-* (33). The generalization is that debuccalization is triggered only by strict adjacency of coronals. Space limitations prevent discussion of this question, but it seems to be a matter regarding the formalization of the OCP rather than alignment per se, which is the focus of this paper.

7. Conclusion

Under the analysis given here, infixed *-ta-* and *-t-* are not special among the Plural Acts: ALIGNR has the same relatively low ranking for all allomorphs. The fact that only a subset of forms can be infixed follows from their prosodic and segmental shape. No stipulation of position for particular allomorphs is necessary — an enormous improvement over the complex statements found descriptively (Oswalt 1961) and derivationally (Buckley 1994). While some lexically idiosyncratic choice is unavoidable, this analysis derives the position of the chosen allomorph from a single alignment constraint for the entire suffixal class, plus general phonological principles. Since the outcome of featural processes must be taken into account in positioning the affix, the data strongly support the use of phonological and morphological constraints which refer to surface representations.

Notes

[1] There are also irregular pairs, further emphasizing the lexicalized nature of the pattern, e.g. *q̇ahq-/q̇acq-* 'rescue', *ṭa:c-/ṭahy-* 'pour', *ʔaš-/ʔacʰulaq-* 'miss (hitting)' (Oswalt 1961: 177).

[2] More precisely, *-at* occurs after /l, n/ and *-aq* after /l/. Some /l/-final roots in (7) and (8) also occur with the longer variant *-ataq*, apparently a combination of the two suffixes, e.g. *qapʰul-**ataq**-* and *muhkul-**ataq**-*. Here and elsewhere, some plurals show loss of vowel length or of a 'laryngeal increment' in the root (Oswalt 1961, Buckley 1992, 1994). These changes are unrelated to the properties which determine whether infixation occurs, and are ignored here.

[3] For Smolensky (1993) these are conjoined constraints: NOCODA combined with each of *DOR, *LAB, and *COR. A violation of *DOR&CODA is assessed for each segment which vio-

lates both conditions — if it is a dorsal and also a coda. Here I use the simpler notations in (14). See also Lombardi (1997b) for another approach.

[4] I have rejected an alternative analysis in which there is suffixation in (11) because the Coronal features of the root and affix can be merged into a single multiply linked element. This approach, while quite plausible in itself, predicts suffixation of -t- as well, which is wrong (§5).

[5] It is always the coda consonant which debuccalizes, and never the onset. I tacitly assume that there are higher-ranked faithfulness constraints for onsets which prevent debuccalization (and, in fact, almost any other featural change in Kashaya) in the onset. See Beckman (1996), Lombardi (1997a) and references therein.

[6] In particular, a full analysis must explain why /c/ loses its separate status as a segment, while other coronals become [h] or [ʔ]. This difference is surely related to the fact that /c/ becomes [y] in a related context (*cic → yic*), and independently, /VyC/ → [V:C]; see Buckley (1994: 138, 302). Plausibly, [V:C] is the preferred outcome for all coronal clusters, but faithfulness to place and laryngeal features prevents full loss of the segment except in the case of plain palatals.

[7] Clusters such as /lt/ and /st/ violate OCP-Cor, but sonorants and fricatives are not permitted to debuccalize, so these violations are tolerated. In (34), however, low ranking of ALIGNR makes it possible to place the stop /t/ in coda position, where its Coronal feature can be deleted.

Another important fact is that even with a root such as *sihwaṫ-* (30b) which ends in a coronal that can debuccalize, we find violation of ALIGNR: *siwa-**h**-ṫ-* rather than **sihwaʔ-t-*. As noted by McCarthy and Prince (1995: 364), roots often have higher-ranked faithfulness than affixes. In Kashaya, deletion of the affixal Coronal feature in -t- is preferred to deletion of the root Coronal feature in *sihwaṫ-*, even at the expense of right-alignment. A full analysis, then, will include the ranking IDENT-ROOT(Cor) » IDENT-AFFIX(Cor).

[8] I know of two verbs, probably variants of each other, which show infixed [h] but do not end in a coronal: -*bo-**h**-ḱ-* 'swell up' and -*bu-**h**-ḱ-* 'be swollen' (Oswalt 1990). This [h] may be due to analogy with -*bo-**h**-ṡ-* 'be puffed up', which has nearly the same meaning and triggers debuccalization of infixed /t/ in the normal way. At any rate, these verbs can be treated as taking an irregular Plural Act form, i.e. underlying /h/. Significantly, the analysis already given predicts that infixation will occur to preserve the Dorsal feature of /ḱ/, as in (35c), so that the same ALIGNR constraint is relevant to the proposed -*h*- allomorph.

[9] Since no verb root ends in /w/, it is also possible to say that -*ʔta* occurs after glides. Because the /y/ in *dutaẏta-* is underlyingly a plain sonorant, it does not debuccalize.

[10] Interestingly, the intervening laryngeal [ʔ] in **duta-ʔta-y-* (40c) appears to be transparent to the OCP, just as a vowel is. This similar behavior is not surprising, since neither type of segment has consonantal place features.

References

Anderson, Stephen R. 1972. On nasalization in Sundanese. *Linguistic Inquiry* 3.253-268.

Beckman, Jill. 1996. *Positional faithfulness*. Dissertation, University of Massachusetts, Amherst.

Buckley, Eugene. 1992. Kashaya laryngeal increments, contour segments, and the moraic tier. *Linguistic Inquiry* 23.487-496.

____. 1994. *Theoretical aspects of Kashaya phonology and morphology*. Stanford, CA: CSLI, Stanford University.

French, Koleen Matsuda. 1988. *Insights into Tagalog reduplication, infixation and stress from nonlinear phonology*. Dallas: Summer Institute of Linguistics.

Hale, Kenneth. 1973. Deep-surface canonical disparities in relation to analysis and change: an Australian example. *Current Trends in Linguistics* 11.401-458.

Kenstowicz, Michael. 1995. Base-Identity and Uniform Exponence: alternatives to cyclicity. *Current Trends in Phonology: Models and Methods*, ed. by J. Durand and B. Laks. Centre National des Recherches Scientifiques, Paris-X.

Lombardi, Linda. 1997a. Positional faithfulness and voicing assimilation in Optimality Theory. Ms., University of Maryland.

____. 1997b. Why Place and Voice are different: constraint-specific repairs in Optimality Theory. Ms., University of Maryland.

McCarthy, John J. 1986. OCP effects: gemination and antigemination. *Linguistic Inquiry* 17.207-263.

____, and Alan S. Prince. 1986. Prosodic morphology. Ms., University of Massachusetts, Amherst, and Brandeis University.

____, ____. 1990. Foot and word in prosodic morphology: the Arabic broken plural. *Natural Language and Linguistic Theory* 8.209-283.

____, ____. 1993. Generalized alignment. *Yearbook of Morphology 1993*, ed. by Geert Booij and Jaap van Marle, 79-153. Dordrecht: Kluwer.

____, ____. 1995. Faithfulness and reduplicative identity. *University of Massachusetts Occasional Papers in Linguistics* 18.249-384.

Oswalt, Robert L. 1961. *A Kashaya grammar (Southwestern Pomo)*. Dissertation, University of California, Berkeley.

____. 1990. Kashaya dictionary: Letters B and C. Ms., Kensington, CA.

Paradis, Carole, and Jean-François Prunet (eds). 1991. *The Special Status of Coronals: Internal and External Evidence* (Phonetics and Phonology 2). San Diego: Academic Press.

Pierrehumbert, Janet. 1993. Dissimilarity in the Arabic verbal roots. *Proceedings of the Annual Meeting of the North Eastern Linguistics Society* 23.367-381.

Prince, Alan S., and Paul Smolensky. 1993. *Optimality Theory: constraint interaction in generative grammar*. Ms., Rutgers University and University of Colorado at Boulder.

Schachter, Paul, and Fe Otanes. 1972. *Tagalog reference grammar*. Berkeley, CA: University of California Press.

Smolensky, Paul. 1993. Harmony, markedness, and phonological activity. Paper presented at Rutgers Optimality Workshop, Rutgers University, October 22-24.

Wilkinson, Karina. 1988. Prosodic structure and Lardil phonology. *Linguistic Inquiry* 19.325-334.

Yip, Moira. 1988. The Obligatory Contour Principle and phonological rules: a loss of identity. *Linguistic Inquiry* 19.65-100.