Squibs and Discussion

KASHAYA LARYNGEAL INCREMENTS, CONTOUR SEGMENTS, AND THE MORAIC TIER

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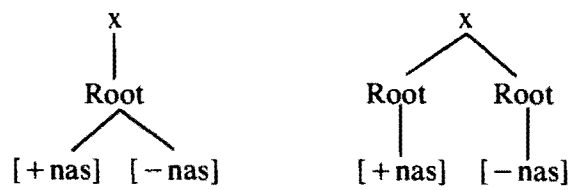
Contour segments are single segments that contain two ordered values for a feature: classic examples are prenasalized consonants, which are [+nas, −nas], and affricates, which have been treated as [−cont, +cont]. Theories differ in the level at which they assume a branching structure exists. For example, Goldsmith (1976), Clements (1985), and Sagey (1986) treat prenasalized stops with a terminal feature contour, as in (1a); Piggott (1987; 1988) and Rosenthall (1988; 1991) argue instead for a Root node contour,[1] with each node dominating a terminal feature, as in (1b):

(1) a. *Feature contour* b. *Root contour*



I present evidence from a different type of contour segment—namely, incremented consonants in Kashaya (Pomoan: northern California)—which require a Root node contour, but at the same time demand a different sort of explanation for what kinds of contours are possible. The data also help to select among competing theories of the timing tier.

1. A number of native languages of California have *laryngeal increments:* a glottal segment, or sometimes vowel length,

The Kashaya data are from Oswalt (1961; 1975). I owe a large debt to discussions with Sharon Inkelas, and am also grateful to Larry Hyman, John McCarthy, Donca Steriade, and three anonymous *LI* reviewers for their comments. An earlier version of this squib was presented at the LSA Annual Meeting in Chicago, January 3–6, 1991.

[1] Although their work precedes the development of feature geometry, Clements and Keyser (1983) propose representations of contour segments where the branching is essentially at the Root node level.

which is intimately connected with the following consonant (Gensler (1986), Oswalt (1986)). In Kashaya there are two types of increments; aspiration /^{h}/ and laryngealization /^{ʔ}/, represented here as raised symbols to distinguish them from the simple segments /h/ and /ʔ/. Although the increments are pronounced identically to these normal glottal segments, they contrast with them in several respects early in the derivation. In addition, Kashaya has a three-way distinction among plain, glottalized, and aspirated consonants.

True consonant clusters are not permitted initially in verb roots, but increments are extremely common here. When the following consonant is unspecified for laryngeal features (a plain voiceless obstruent or a voiced sonorant), either increment is possible, though neither need occur:

(2)	a.	-^{h}ṭanṭala-	'fade'
		-^{ʔ}ṭi-	'roll up'
		-ṭat-	'twist'
	b.	-^{h}luṅ-	'remove an appendage'
		-^{ʔ}lu-	'wrap'
		-luċ-	'put over one's head'

If the consonant itself has a laryngeal feature (if it is glottalized or aspirated), that feature must agree with the increment. Specifically, the only increment found before an aspirate is /^{h}/, and only /^{ʔ}/occurs before an ejective:

(3)	a.	-^{h}p^{h}o-	'overflow'
		-^{h}t^{h}i-	'do to pieces'
		-^{h}k^{h}uy-	'burn'
	b.	-^{ʔ}p'an^{h}-	'shut'
		-^{ʔ}t'a-	'detect'
		-^{ʔ}k'u-	'finish'

No form such as *-^{ʔ}*t^{h}i*- or *^{h}*t'a*- is possible. We see from these data the first fact that our analysis must capture: the laryngeal increment depends on the laryngeal features of the following consonant. The increment is not a predictable side effect and must be present in underlying representations, since the same consonant is found preceded by both increments (or neither) in (2), and all combinations are attested: *ca*- 'sit', -*c^{h}a·*- 'grasp', ^{h}*ca*- 'fly', -^{h}*c^{h}a*- 'knock over'.

The maximal syllable in Kashaya is CVV or CVC; normally onset clusters are prohibited, but there is good evidence that the laryngeal increment and the following consonant link together as an onset during the first part of the derivation. Their distribution is one clue: incremented consonants are common word-initially (e.g., ^{h}*coma* 'feast', ^{ʔ}*da* 'path')[2] and root-initially

[2] As argued in Buckley (1990), surface [d] derives from underlying /ṅ/, and so takes the increment /^{ʔ}/.

(examples above), where true clusters are not possible. Most crucial, however, is the evidence of reduplication. Idiosyncratically in nouns and more productively in verbs, a rule copies the base and trims it to a single CV syllable (assuming the model of Steriade (1988)):

(4)	kolo·	→	kolo·lo	'hollow'
	šaqa·	→	šaqa·qa	'valley quail'
	hopom̥	→	hopom̥po	'smokehole'
	ʔuyboṭ̥	→	ʔuyboṭ̥bo	'gnat'

A consonant preceding the final CV is not copied:

(5)	miʔdišṭi	→	miʔdišṭiṭi	'wrentit'
	q^haʔaylo	→	q^haʔaylolo	'ogre'

When the onset consonant of the base-final syllable takes an increment, however, the increment is included in the reduplicated element:

(6)	hi^hla-	→	hi^hla^hla-	'gossip'
	$\dot{s}u^hmi$-	→	$\dot{s}u^hmi^hmi$-	'glimmer'
	$ha^ʔdi$	→	$ha^ʔdi^ʔdi$	'various'
	$\dot{s}u^ʔnu$	→	$\dot{s}u^ʔnu^ʔnu$	'huckleberry'

This case must be distinguished from that of ordinary clusters where the first consonant happens to be a nonincremental /h/ or /ʔ/; here the glottal consonant is not copied, following the pattern in (5):

(7)	nahmo	→	nahm̥omo	'armpit'
	daʔṭ̥o	→	daʔṭ̥oṭ̥o	'screech owl'

The most straightforward explanation for the difference between (6) and (7) is that whereas in *daʔṭ̥oṭ̥o* the [ʔ] is a coda consonant, in *haʔdiʔdi* the [ʔ] is somehow grouped with the [d]. Since onset clusters are not permitted, the increment and following consonant in (6) must be treated as a single contour segment.

Eventually the increment is delinked from onset position (see below). If word-internal, as in the reduplicated forms above, the increment then syllabifies as the coda of the preceding syllable, where it bears weight and is pronounced the same way as nonincremental /h/ or /ʔ/. If word-initial, its fate depends on the preceding word: if the increment can syllabify as a coda, it is preserved, but if it cannot (as utterance-initially), it is stray-erased:

(8)	ʔimo ^{h}la·le	→	ʔimohla·le	'maybe a hole'
	^{h}la·le	→	la·le	'maybe'

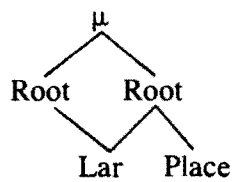
The deletion supports the idea that increments are not part of a complex onset sanctioned by the syllable structure, since such an analysis predicts that the utterance-initial glottal segment

should remain: if the cluster is well formed lexically, it ought to be well formed postlexically, where constraints such as Structure Preservation are relaxed, not made stricter (Kiparsky (1982), Borowsky (1986), Itô (1986), Rice (1990)). The presence of increments word-internally as in (6) rules out extraprosodicity as a general solution for increments.

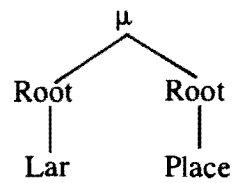
2. Our analysis must capture the general three-way distinction among a normal cluster where the first consonant is glottal (*hC*), glottalization or aspiration of a consonant (C^h), and an incremented consonant (^hC). More specifically for the increments, there are two fundamental facts to account for: the laryngeal features of an incremented consonant agree with those of the increment; and the increment and consonant behave as an onset. Following conventional practice, I represent the shared features by linking a single Laryngeal node to two elements on a higher tier—in this case, the Root tier. Further, I propose that the special behavior of the two segments as a complex onset be represented by underlying association to a single mora. This lexical specification of idiosyncratic onsethood encodes the markedness of increments directly, and follows work such as that of Kiparsky (1982; 1991), Poser (1984), Pulleyblank (1986), Inkelas and Cho (1991), and others in treating exceptionality as prespecified structure that blocks the application of structure-building default rules.

For the forms in (3), where a laryngeal increment precedes a consonant that itself has laryngeal features, a single Laryngeal node is linked to both elements (the increment and the consonant) to express the featural dependence. In (9a) the two elements correspond to the two Root nodes; their joint onset status is reflected by the single mora.

(9) a.



b.

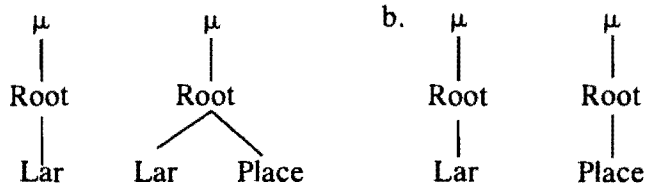


(9a) expresses well-formed -$^ht^hi$- but not ill-formed *-$^?t^hi$-. When an increment precedes a consonant with no laryngeal features, a different representation is called for. We cannot simply associate the Laryngeal node with the same Root node as the following Place features, since then it would indicate, for example, glottalized /ṭ/ or aspirated /t^h/rather than incremented /$^?$t/ or /^{h}t/. As the consonant is underspecified for laryngeal features, it should have no Laryngeal node at all. In addition, since either increment is possible, the increment needs its own Laryngeal node, independent of the following consonant. This gives us the geometry in (9b) for such forms as -$^hlu\dot{n}$- and -$^?lu$-

in (2).[3] From the two representations in (9) it follows that when an increment precedes a consonant that has laryngeal features, the increment must correspond; but when the consonant has no underlying laryngeal features, the increment can take either form. Note that each representation requires two Root nodes. Assuming a model of feature geometry such as that of McCarthy (1988), the presence of both Root nodes is also necessary to permit independent specification of the features [cons], [son], [cont], and [nas]: whereas the increment is always a laryngeal "glide," the following consonant can belong to any class, as long as the laryngeal features are consistent.

These incremental representations are distinct from simple clusters, where the /h/ or /ʔ/ preceding a consonant has its own timing unit:

(10) a. b.



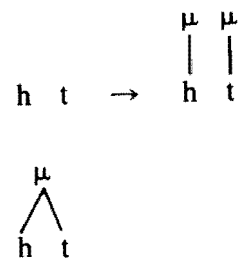
A cluster as in (10a) is one where the first consonant happens to be a glottal and the second consonant also has laryngeal features (e.g., *ċaʔcʰo* 'nine', *qaʔpʰula* 'wormwood'); such clusters have the same distribution as other nonincremental clusters. It is also possible, of course, to have a simple glottal consonant before a consonant that has no underlying Laryngeal node, as in (10b). This represents the situation in *nahmomo* from (7), for example, and contrasts with (9b).

3. I have represented the two Root nodes in incremented consonants as linked to a single mora, but this configuration is not possible in all moraic theories. In the approach exemplified by Hayes (1989) and McCarthy and Prince (1990), onset consonants do not bear a mora at any point in the derivation, and there is no structure between the onset Root node and the syllable node to which it eventually links. The distinction between an incremented consonant such as /ʰt/ and a true cluster /ht/ (corresponding to (9b) and (10b)) could not be represented underlyingly: Hayes (1989) rejects the idea of underlying syllable structure, and a separate skeletal tier is antithetical to the moraic approach. Since incremented consonants occur in onset position, under this theory they never bear a mora to which the two Root nodes could be underlyingly linked.

[3] We need make no special statement to prevent spreading of the Laryngeal node in (9b)—which would incorrectly neutralize the contrast between (a) and (b)—because Kashaya lacks automatic spreading in general.

Under the moraic theories of Hyman (1985) and Zec (1988), there is no dilemma. Their frameworks differ in a number of respects, but in both cases the onset links to the head mora rather than directly to the syllable. Since moras are available underlyingly, and onsets are dominated by moras, it is a simple matter to encode the difference between a cluster and an incremented consonant without appealing to a skeleton or underlying syllables. For example, following Zec:

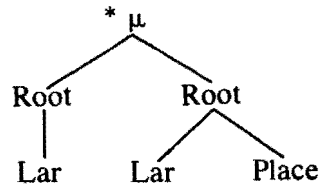
(11) /ht/:



The regular Morification algorithm applies to /ht/, giving a mora to each consonant; but since /ʰt/ has exceptional mora structure underlyingly, it does not undergo Morification and behaves in level 1 as a complex onset. Whereas the syllable-linked-onset theory runs into serious problems here, Kashaya laryngeal increments support the mora-linked-onset version of moraic theory as it stands.[4]

4. Since the laryngeal features of the increment and following consonant cannot be independent of each other, the following representation must be ruled out:

(12)



How are we to exclude (12)? At a basic level, Sagey (1986) limits possible contours by stipulating that class nodes cannot form contours; Piggott (1988), on the other hand, proposes that *only* class nodes (like Root, Place, Laryngeal) can form contours. Since in Kashaya the contour is clearly of a class node (the Root node), we must pursue the latter approach. Rosenthall (1988; 1991) constrains possible contours in Piggott's framework by the Contour Node Condition (CNC):

(13) Class nodes A and B on tier T can form a contour when the head dominates the same set of nonnull class nodes as the nonhead.

[4] Katada (1990) gives evidence from a Japanese language game to support the mora-linked onset. Waksler (1990) and Hayes (1991) adopt this version of moraic theory as well. For clarity, in these representations I omit the vowel that follows the onset consonant.

Following Shaw (1987), the "head" of a contour is the right node. Thus, we may paraphrase (13) as follows: A sequence of class nodes AB can be linked to the same higher node only if those class nodes dominated by A are also dominated by B. This means that the Root nodes in (1b) can form a contour if the right Root dominates the same class nodes (e.g., Place) as the left Root. This constraint ensures, for example, that the nasal and oral components of a prenasalized consonant are at the same place of articulation.

The CNC correctly rules out the geometry in (12), since the two Root nodes dominate different Laryngeal nodes. It also permits (9a), since the right (head) Root node dominates all class nodes (in this case, just Laryngeal) that the left (nonhead) Root dominates. In (9b), however, there are no shared class nodes, but the configuration must still be permitted: the CNC incorrectly rules it out. Another problem with the CNC arises if we accept the considerable arguments for a moraic timing tier (Hyman (1985), McCarthy and Prince (1986), Zec (1988), Hayes (1989)). When every segment has its own "x" or other timing slot, only contour segments such as prenasalized stops have more than one Root node under a single timing slot. If, on the other hand, segmenthood is defined by the Root node and the timing tier is moraic, the common situation of having more than one segment linked to a single mora will be ruled out unless the CNC is coincidentally satisfied by the segments involved.

Is there an alternative to the CNC? I suggest that multiple class nodes can be prohibited by a type of Obligatory Contour Principle (OCP) effect. For example, in Kashaya only one Laryngeal node is permitted under each mora:

(14) $*[\text{Lar Lar}]_{\mu}$

Since vowels are underspecified for [voice], they require no Laryngeal node and a CV mora is permitted. This resembles the constraint in Seri against more than one Laryngeal node in a syllable (Yip (1988)). We need in addition a constraint stating that the strong (head) mora can dominate only one Root node besides the vowel that heads the syllable:

(15) Maximal strong mora: $\begin{bmatrix} \text{Root} & \text{Root} \\ [+\text{cons}] & [-\text{cons}] \end{bmatrix}$

This template rules out onset clusters. Since the number of Root nodes permitted is determined by whether the mora heads a syllable, however, the template is not enforceable until Syllabification occurs—at level 2 in Kashaya. In underlying representations and at level 1, the prespecified linking of incremented consonants to one mora exempts them from the normal constraints against word- and root-initial clusters and permits them to reduplicate in the special way illustrated above. Once Syllabification occurs, constraints on syllable structure such as that

in (15) take effect: the increment is delinked from the strong mora and thereafter behaves like an ordinary glottal consonant. Word-internally, the former increment syllabifies as a coda. Word-initially, it cannot syllabify but is moraically licensed (Bagemihl (1991), Zec (1988)) until the postlexical component. As seen in (8), at that point it must similarly syllabify as a coda or be deleted.

Similar effects can be generated for other contour segments. For example, if prenasalized consonants are the only onset clusters permitted in a language, a restriction against more than one consonantal Place node per mora ensures that the nasal must share place of articulation with the following consonant:

(16) $*\begin{bmatrix} [+\text{cons}] & [+\text{cons}] \\ | & | \\ \text{Place} & \text{Place} \end{bmatrix}_{\mu}$

The same constraint actually holds in Kashaya as well, since the increments are not permitted to bear place features. Similarly, affricates must have the same place of articulation for the stop and fricative portions of the segment, and they could perhaps be handled with a similar constraint. Recent research suggests, however, that affricates are not contour segments at all: the two values for [cont] may be unordered relative to each other (Hualde (1988), Lombardi (1990)), or affricates may be phonological stops that are realized with phonetic affrication (Steriade (1989)). If either of these claims is true, affricates are not relevant to the theory of contour segments.

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Adjunct Extraction from NP and the ECP

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1. The Problem

Both Huang (1982) and Chomsky (1986) observe that their accounts of the restriction against extraction *from* an adjunct that appears within NP do not extend to the restriction against extraction *of* an adjunct that appears within NP. In particular, neither the Condition on Extraction Domain (CED) nor Sub-