

Kashaya Closed-Syllable Shortening and Prosodic Syllabification

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Itô (1986, 1989) and others have argued persuasively that phenomena such as epenthesis, cluster simplification, and closed-syllable shortening should be treated as natural side-effects of syllabification rather than as separate rules which are in principle unrelated to the syllable structure of the language. For example, when a consonant cannot be incorporated into a syllable, one language might provide an epenthetic vowel to serve as the nucleus of a new syllable which can accommodate the consonant, while another language might simply delete the offending segment. Similarly, the process by which a long vowel shortens in a closed syllable can be made to follow from the fact that the language does not permit a VVC rime, so it reduces to VC.

Within this context, mechanisms for adding weight to a postvocalic consonant — such as the Weight by Position rule of Hayes (1989), which assigns a mora to coda consonants — offer a simple explanation of closed-syllable shortening. Take a language with a maximal rime of VV or VC; this can be analyzed as a maximum of two moras per syllable and no branching moras. When a coda consonant following a long vowel is assigned a mora by the rule, the syllable structure is violated: the long vowel requires two moras, so the addition of a third mora for the coda consonant exceeds the maximum for the language. The coda consonant cannot simply link to the second mora of the long vowel, since that would create a branching mora, which is also ill-formed. Instead, the long vowel reduces to a single mora — becoming a short vowel — and the end result is one vocalic and one consonantal mora.

Hayes, following Hyman (1985), points out that only some languages have the rule of Weight by Position, and that its details can vary from language to language (in some cases affecting only sonorants, for example); consequently it must be treated as a language-specific rule. Still, Hayes treats the addition of the mora as an integral part of Syllabification. Archangeli (1989) argues, however, that it is in fact a separate rule which can be ordered before or after syllabification, based largely on evidence from Yawelmani that certain rules must follow Syllabification but precede Weight by Position.

In this paper I examine data from Kashaya, a Pomoan language of northern California, which bears on this question. After illustrating the basic syllable structure, I show that Syllabification and Weight by Position both operate in the lexicon, because CVC syllables count as heavy for lexical processes. For CVVC syllables, however, the vowel counts as long for both lexical and postlexical rules, and is not shortened until late in the derivation; this means that Weight by Position

and Syllabification cannot both have applied lexically. I advocate an analysis of these facts in terms of constraints: the prohibition on trimoraic syllables blocks the creation of superheavy CVVC syllables in the lexicon; the coda C is moraicly licensed by not syllabified. Postlexically, a requirement for syllabic licensing overrides the two-mora limit so that the coda receives weight, but the three-mora syllable is repaired by Closed-Syllable Shortening.¹

1. Kashaya Syllable Structure

The maximal surface syllable in Kashaya has two moras, taking the shape CVV or CVC; in this respect it is like Yawelmani and a great many other languages. Word-finally one finds the superheavy syllables CVVC or CVCC, due to the extra-prosodicity of the final consonant (Itô 1986); again, this situation is found in numerous languages, Arabic being a commonly cited example (McCarthy 1979). The following words illustrate the possible syllable structures; spaces represent syllable breaks:

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|-----|-----------------------------|--------------------|-----|-----------------------------|------------------------|
| (1) | <i>mo ma·y</i> | ‘I saw it run’ | (2) | <i>si namt^h</i> | ‘is not drowning’ |
| | <i>šuh we·n</i> | ‘is shaking’ | | <i>si namy</i> | ‘just drowned’ |
| | <i>yo q’o·t^h</i> | ‘isn’t keeping it’ | | <i>mo· lans’</i> | ‘might have run down’ |
| | <i>qa ne ma·c’</i> | ‘is related’ | | <i>cac’q^h</i> | ‘must have seen (pl)’ |
| | <i>qa šo·q^h</i> | ‘is getting well’ | | <i>mah saʔt^h</i> | ‘isn’t taking it away’ |

Word-internally we find CV, CVV, and CVC (every syllable contains an onset); these are all permitted by the limit of two nonbranching moras. In (1) the words end in CVVC; if the final C is extraprosodic, then for lexical purposes these final syllables are of the well-formed shape CVV: *moma*·<*y*>. Similarly, the final CVCC syllables in (2) are equivalent to CVC: *sinam*·<*t^h*>.

When morphological concatenation leads to a word-internal CVVC syllable, the long vowel shortens. The verbs below are given in underlying and surface forms, showing the effect of Closed-Syllable Shortening; examples are included in which the underlying long vowel is allowed to surface:

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|-----|----------------------|---|--------------------|-----------------------------|
| (3) | <i>hi-s’á·-ti</i> | → | <i>hi s’á· ti</i> | ‘about to break’ |
| | <i>hi-s’á·-hqa-w</i> | → | <i>hi s’áh qaw</i> | ‘cause to break’ |
| | <i>hi-s’á·-ns’</i> | → | <i>hi s’áns’</i> | ‘might have broken’ |
| (4) | <i>da-hwe·n-i</i> | → | <i>dah we· ni</i> | ‘shake your hand!’ |
| | <i>da-hwe·n-me?</i> | → | <i>dah wen me?</i> | ‘shake your hands! (pl)’ |
| | <i>da-hwe·n-ti</i> | → | <i>dah wen ti</i> | ‘about to shake one’s hand’ |

It is clear that a nonfinal CVVC sequence cannot be fit into a syllable of the language; shortening the vowel remedies the situation. The question remains: when and how does it shorten?

Before continuing with the Kashaya data, we must briefly discuss the rule of Weight by Position. Hayes (1989) suggests that when a postnuclear consonant is syllabified as a coda, it can be assigned a mora on a language-specific basis, making the syllable heavy. This formulation treats Weight by Position as an integral part of Syllabification; adjunction of the coda to the syllable and the addition of the mora are handled as a single step. Archangeli (1989) gives a simpler version of the rule: it just adds a mora to a segment, subject to two independent constraints: the maximal syllable is bimoraic, and onsets cannot bear a mora. In addition,

¹ Data on Kashaya are from Oswalt (1961, 1973, 1988) and elicitation from Milton ‘Bun’ Lucas. The symbol ‘c’ represents the alveopalatal affricate [č]. I am grateful to Larry Hyman, Sharon Inkelas, Diana Archangeli, Lisa Selkirk, and Donca Steriade for comments and discussion. Loanwords with irregular syllable structures are not treated here; see Buckley (in prep).

Archangeli assumes that the coda can be syllabified before Weight by Position applies to it: for her, Syllabification takes place independent of Weight by Position, while for Hayes the two are inseparable. Archangeli presents data from Yawelmani in support of the position that the two processes must be treated as independent — specifically, the rules of Vowel Harmony and Lowering must follow Epenthesis (itself dependent on Syllabification), but must precede Closed-Syllable Shortening (which results from Weight by Position). We will see below that Kashaya also supports the separation of Syllabification and Weight by Position, albeit in a somewhat different fashion.²

2. CVC Syllables

In the lexicon, a CVC syllable must count as heavy. We see this in the effect of a rule of Rhythmic (or Iambic) Lengthening (Hayes 1985, Prince 1990). Foot structure in Kashaya is based on the iamb.³ Lexically, feet are constructed from left to right, and a vowel in a short syllable in strong metrical position is lengthened:

- | | |
|---|---|
| (5) <i>mo-mul-ic²-ed-uced-u</i>
'keep running all the way around' | (6) <i>kel-ad-uwad-uced-u</i>
'keep peering here and there' |
| (. x) (. x) (. x) (.)
<i>mo mu· li c'è· du ce· du</i> | (. x) (. x) (. x) (.)
<i>ke la· du wa· du ce· du</i> |

All syllables in these two verbs are underlyingly CV, but those in strong iambic position are lengthened. Compare now two other words in which the first syllable of each form is closed:

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|--|--|
| (7) <i>kel-mul-ic²-ed-uced-u</i>
'keep peering all the way around' | (8) <i>mo-hti-mul-ac²-iyic²-i</i>
'keep running around! (pl)' |
| (x) (. x) (. x) (. x)
<i>kel mu li· c'è du· ce du·</i> | (x) (. x) (. x) (. x)
<i>moh ti mu· la c'ĩ· yi c'ĩ·</i> |

The CVC syllables *kel* and *moh* clearly count as heavy, since they form their own iambs, which in turn displaces by one the syllables which undergo Rhythmic Lengthening. This shows that Weight by Position has applied to the CVC syllables to make them heavy; that is, the coda consonant has acquired a mora. Rhythmic Lengthening is a lexical rule — it applies within the word and in derived environments only (see below also) — so Weight by Position must apply to CVC syllables lexically as well.

As we would expect, CVC syllables also count as heavy postlexically. Although iambic foot structure is built in the lexicon, accent is not assigned until the postlexical component. This is seen most easily in the fact that accent is phrasal, and the iamb which determines the accent can span a word boundary:

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|---------------------------------------|--|-------------------------------------|
| (9) <i>ʔime ʔahqol</i>
'long fuzz' | (10) <i>p^hala maʔa</i>
'eat again' | (11) <i>ʔime hmi</i>
'real fuzz' |
| (. x)
<ʔi> <i>me ʔáh qol</i> | (. x)
<p ^h a> <i>la má ʔa</i> | (x)
<ʔi> <i>méh mi</i> |

² The apparent assumption in the previous literature is that languages will resolve an impossible CVVC syllable by shortening the vowel rather than deleting the coda consonant; this fact can be attributed to Maximization of Association (McCarthy and Prince 1986, Archangeli to appear), whereby a solution which results in no loss of melodic material is preferred over one which does involve such loss (in this case, the coda consonant).

³ The foot notation used here is from Hayes (1987). A branching iamb is (. x), a nonbranching iamb (x), and a stressless foot (.). Angled brackets <> represent extrametricality.

In all of these cases the first syllable of the phrase is extrametrical. A rule of Initial-Syllable Extrametricality applies in the lexicon to the stem, and is blocked by minimality if the stem is just one syllable long. The extrametricality assigned by this rule persists to the postlexical component as long as the word occurs in phrase-initial position; otherwise it is lost by the Peripherality Condition (Hayes 1982, Harris 1983).

Example (11) illustrates that a closed syllable (*meh*) counts as heavy for accent assignment as well; the accents of the words in (5) to (8) serve as further evidence. Since these verbs have monosyllabic stems (*mo-* and *kel-*), Initial-Syllable Extrametricality would exhaust the domain and does not apply:

- (12) (· x) *mo mú· li c'è· du ce· du* (13) (x) *kél mu li· c'è du· ce du*

When the words are spoken in isolation, the lexical feet used for Rhythmic Lengthening correspond to the postlexical foot that determines the accent — but the two are not in fact the same. Following postlexical Deforestation to remove the lexical feet (Steriade 1988), a new iamb is constructed at the left edge of the phrase, and the strong position of the foot receives the accent. In (12) and (13) the new iamb duplicates the old. If we place the word *p^hala* ‘again’ in front of the verb, however, the accent falls on the initial syllable of the verb regardless of its weight, since the syllable *la* is in each case the weak branch of the postlexical iamb:

- (14) (<*p^ha*> (· x) *la mó mu· li c'è· du ce· du* (15) (<*p^ha*> (· x) *la kél mu li· c'è du· ce du*

Notice that there is no change in which vowels show the effect of Rhythmic Lengthening: that rule is lexical and the new accent iamb is postlexical.

3. CVVC Syllables

We saw in (3) and (4) the operation of Closed-Syllable Shortening when a long vowel is followed by a coda consonant. The theoretically important data come from the interaction of this shortening and the placement of accent. Recall from section 2 that Weight by Position applies lexically to CVC syllables, which count as heavy for lexical Rhythmic Lengthening and postlexical Accent Placement. In the case of CVVC syllables, however, the Closed-Syllable Shortening motivated by Weight by Position cannot be permitted to apply in the lexicon, and in fact must follow Accent Placement in the postlexical component. Before motivating this claim we must first examine in more depth the nature of extrametricality in Kashaya.

In addition to the extrametricality of initial syllables illustrated in (9) to (11), there is a rule which makes the leftmost foot of a phrase extrametrical if it consists of CVV. The postlexical rule, Long-Vowel Extrametricality, applies whether or not the initial syllable of the first word in the phrase is already extrametrical (which depends on the length of the stem of that word). The result is that some phrases have two invisible syllables at their left edge, and accent is assigned to the material that follows these syllables.⁴ First, examples where only Long-Vowel Extrametricality has applied:⁵

⁴ The Peripherality Condition is not violated here since the two extrametrical constituents are on different tiers (one syllable, one foot); see Buckley (in prep). The use of extrametricality is not crucial to the present argument, as long as the vowel is still long when accent is assigned.

⁵ The second of two adjacent vowels has the effect of lengthening the preceding vowel, by deletion of the second vowel melody and compensatory lengthening (rightward spreading) of the first melody, e.g. /oi/ → [o:] in (16). This occurs lexically, well before the postlexical rule of Long-Vowel Extrametricality, so the output of compensatory lengthening behaves exactly like any other long vowel for the purposes of the rule.

(16) *mo-ibic-ba*
 ‘after running away’

(x)
 <mo·> *bíc’ba*

(17) *mo-ad-u ?e· mu*
 ‘he ran’

(· x)
 <mo·> *du ?e· mu*

The syllable *mo·* is ignored and an iamb is constructed on the following material. Now consider phrases beginning with *?ima-ta* ‘woman’, where the initial syllable is already invisible before Long-Vowel Extrametricality applies, so that two syllables end up invisible:

(18) *?ima-ta hmi*
 ‘a real woman’

(x)
 <?i ma·> *táh mi*

(19) *?ima-ta t^{hi}n e· mu*
 ‘that is not a woman’

(· x)
 <?i ma·> *ta t^{hi} ne· mu*

The displacement of accent onto the following material indicates that the first two syllables are both extrametrical. Notice in (11) that only a CVV foot becomes invisible by this rule, not a CVC foot such as *meh*.

Now we can return to the case of CVVC syllables. Judging from the surface form of a word like *his’ahqaw* in (3), we would expect the accent to fall on the second syllable, parallel to (11). But the accent is actually *his’ahqáw*, not **his’áhqaw*. Similarly, the accent on *dahwenmé?* from (4) is not the expected **dahwénme?*. The explanation for these accents is found not in the surface syllable structure, but in the underlying distribution of vowel length: accent is assigned before the long vowel in the CVVC syllable is shortened, so that it undergoes Long-Vowel Extrametricality:

(20) <hi> *s’a-h qaw* → <hi s’a-h> *qaw* → <hi s’ah> *qáw*

The opposite order, where Shortening bleeds Long-Vowel Extrametricality, predicts the wrong result:

(21) <hi> *s’a-h qaw* → <hi> *s’ah qaw* → *<hi> *s’áh qaw*

One might be tempted to apply Long-Vowel Extrametricality in the lexicon before Weight by Position, so that the CVVC syllable will be marked as invisible to accent before it is shortened to CVC, but Long-Vowel Extrametricality is a postlexical rule. It is not blocked by minimal word requirements, as is lexical Initial-Vowel Extrametricality:

(22) *?ic^{ha}· t^{hi}n e· mu*
 ‘that is not a spider’ <?i c^{ha}·> *t^{hi} né· mu* * <?i> *c^{há}· t^{hi} ne· mu*

Here the entire word *?ic^{ha}·* ‘spider’ is invisible. This result is explained if Long-Vowel Extrametricality applies to a phrase rather than a word: the phrase is not exhausted by the application of the rule. In other words, while Weight by Position must apply to CVC in the lexicon, it cannot apply to CVVC there, since the long vowel must persist to the postlexical component.

4. Analysis

The problem presented by the Kashaya data is not simply one of ordering, since both Syllabification and Weight by Position must be available to apply to CVC syllables in the lexicon, well before Accent Placement. Rather, we must explain why these rules are prevented from applying at the same time to CVVC syllables. There are two basic analyses possible: Syllabification applies to the coda consonant of CVVC syllables lexically, but it does not bear weight (and cause Shortening)

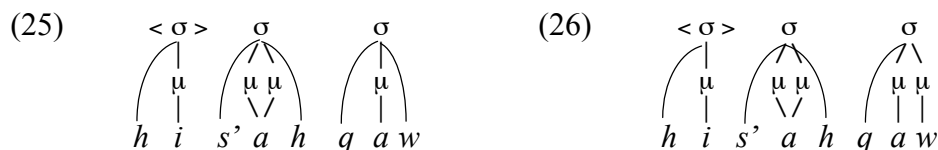
until the postlexical component; or the coda C bears weight, but is not syllabified (and therefore has no effect on syllable weight) until postlexically. I will consider each of these possibilities in turn.

4.1. Syllabification without Weight by Position

Suppose that Weight by Position is active lexically and postlexically, but some other principle which governs its application differs from one component to the other. A natural candidate is that lexical Weight by Position is blocked from applying to CVVC syllables in Kashaya by the limit of two moras per syllable. We have already seen that this constraint is necessary (along with a restriction against branching moras) to limit the syllable types. Since the effect of Weight by Position is to insert a mora, the presence of two moras for a long vowel blocks its application — the addition of a third mora for the coda consonant would violate the two-mora limit. (The same constraint blocks Rhythmic Lengthening in closed syllables.) Lexically in Kashaya, the bimoraic maximum is an absolute constraint which can never be violated.

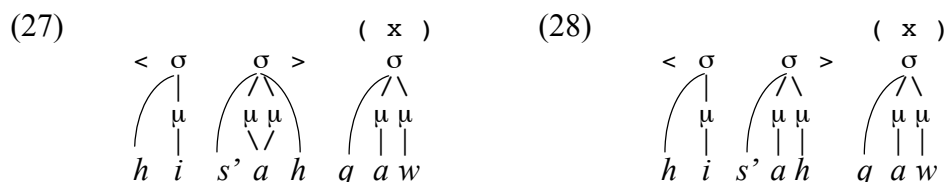
Postlexically, under such an analysis, this constraint persists but is weakened: Weight by Position can apply to create a trimoraic syllable, but the output must be REPAIRED immediately by shortening the long vowel (cf. Archangeli and Pulleyblank in prep., Paradis 1988, Yip 1988). The different behavior of Weight by Position with respect to CVC and CVVC syllables follows not directly from the rule but from an independent constraint on the application of the rule.

Let us consider the derivation of a CVVC syllable under this analysis, using *his'ahqáw* from (20) as an example. The underlying moraic structure encodes the difference between long and short vowels; after Syllabification and Initial-Syllable Extrametricality we arrive at (25):⁶



Weight by Position applies to the final CVC syllable, making it heavy, but is blocked from applying to the CVVC syllable *s'a·h* and the word exits from the lexicon with the structure shown in (26).

Postlexically, Long-Vowel Extrametricality applies, and the accent is placed on the final syllable (27):



Two-mora limit is relaxed (not turned off) and Weight by Position can apply to the CVVC syllable, but to avoid a trimoraic syllable the vowel loses a mora and shortens, yielding the final form of the word in (28).

In addition to the Yawelmani evidence, Kashaya gives another reason to suspect that Weight by Position is distinct from Syllabification: Weight by Position is blocked from applying to CVVC syllables in the lexicon, but if every segment must

⁶ The absolutive suffix *-w* is exceptional in not being extraprosodic, so the final syllable counts as heavy. This is comparable to a suffix such as English *-ic* which, unlike most adjectival suffixes, is not extrametrical (Hayes 1982, Inkelas 1989).

be prosodically licensed (Itô 1986, 1989) the coda consonant must be syllabified by a separate process which is not blocked by the two-mora constraint (as illustrated in (25)). If Weight by Position and Syllabification were the same rule, either both would apply, or neither would; since Syllabification applies by itself in the lexicon, it must be separate from Weight by Position and immune to blocking effects on that rule. So while Syllabification can still be treated as an everywhere rule, Weight by Position is a rule which can be ordered. Postlexically, it follows Long-Vowel Extrametricality (and perhaps also Accent Placement).

There are two major difficulties with the analysis outlined above. First, when a final extraprosodic \bar{C} becomes visible, it must adjoin to the preceding syllable without triggering Weight by Position; otherwise we would never see forms of the type in (1). The crucial difference between word-internal CVVC syllables (which shorten) and word-final CVVC syllables (which remain long) is that only the former exit from the lexicon fully syllabified:

- (29) *bit'e-l-ti* → *bit'elti* 'is about to sew'
bit'e· <l> → *bit'e-l* 'is sewing'

The word-final /l/ is marked extraprosodic before any rules, including Syllabification, have an opportunity to apply. In effect, Weight by Position cannot be allowed to apply to coda consonants unless they were syllabified in the lexicon; but exactly how to get this result is not clear. There is also the problem of phrase-internal cases. When a phrasal prosodic constituent is constructed, which must happen before Long-Vowel Extrametricality (since it applies to a phrasal domain), word-final invisibility within that phrase is lost on any word which is not at the end of the phrase due to the Peripherality Condition; the final C will syllabify, becoming vulnerable to Weight by Position.

The second problem is that we are forced to assume three degrees of strength for a constraint: blocking (no violation permitted), repair-triggering (violation permitted but repaired), and turned off (violations permitted and not repaired). This taxonomy goes beyond other work on constraints. For example, Paradis (1988) argues that constraints are either 'on' or 'off', and that the difference between blocking and repair-triggering effects can be predicted from the interaction of conflicting constraints. Similarly, Mohanan (1989) proposes that syllable well-formedness conditions can be on or off in different (contiguous) levels of the lexicon; there is no distinction between degrees of being turned on. The approach just presented requires a significant increase in the power of constraints.

4.2. Weight by Position without Syllabification

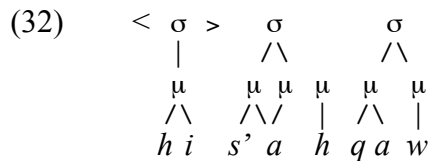
The main alternative to the previous analysis is to supply a consonant following a long vowel with a mora in the lexicon, but not to syllabify it until the postlexical component, at which time shortening takes place. We can rely on the same constraint against trimoraic syllables to prevent Syllabification, but crucially Weight by Position must be ordered before Syllabification. This ordering, in fact, is precisely what is embodied in the moraic theories of Hyman (1985), where in the general case all consonants have underlying weight, and lose it when they become onsets; and of Zec (1988), where consonants do not normally have underlying moras but all assignment of moras ('Morification') takes place before Syllabification.

For reasons given below, I assume Zec's theory here. Reconsider the derivation of *his'ahqáw*. Only the long vowel needs underlying moraic structure (30):

- (30) $\begin{array}{c} \mu \mu \\ \backslash / \\ h i \quad s' a h \quad q a w \end{array}$ (31) $\begin{array}{c} \mu \quad \mu \mu \mu \quad \mu \quad \mu \\ / \backslash \quad / \backslash / \quad | \quad / \backslash \quad | \\ h i \quad s' a h \quad q a w \end{array}$

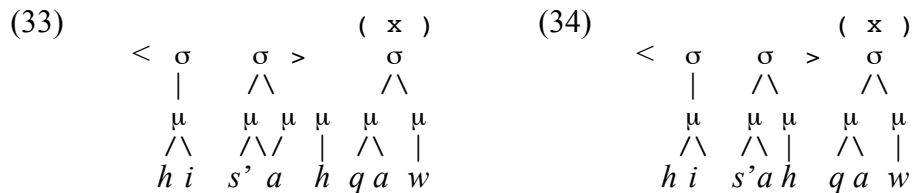
The Morification algorithm is based on sonority: basically, a string of segments with ascending sonority from left to right is grouped under a mora (if there is no mora already associated to one of the segments, then a mora is provided). In a language like Kashaya where complex onsets are disallowed, the effect of the algorithm is to group consonants with the following vowel, and if no vowel follows then the consonant acquires its own mora (giving the effect of Weight by Position). This yields (31).

In Zec's theory, the mora is the lowest constituent of the prosodic hierarchy, and every segment must be licensed by a mora. This follows other work suggesting that association to a mora (as opposed to a syllable) is sufficient to satisfy Itô's (1986) prosodic licensing requirement: see Hyman (1985, 1990) for Gokana and other West African languages, Bagemihl (1989) for Bella Coola, and Lin (1987) for Piro. If in Kashaya prosodic licensing is satisfied by Morification, it is not necessary for every segment also to be linked to a syllable. In fact, due to the lexical restriction on bimoraic syllables, I propose that the /h/ will not be able to join a syllable:



(Initial-Syllable Extrametricality has applied to the first syllable as above.) Unable to serve as onsets here, both /h/ and /w/ have acquired moras of their own. The /h/ cannot be a coda since the preceding syllable already has two moras; it cannot be an onset since there are no complex onsets; and it cannot head its own syllable since it is not sufficiently sonorous. The segment is not stray erased, however, because it is prosodically licensed by the mora.

At the beginning of the postlexical component, Long-Vowel Extrametricality applies, and the accent is placed on the final syllable (33):



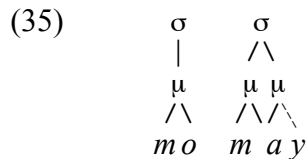
In section 4.1, we were required to say that the two-mora limit was 'relaxed'; here we could say the same thing, so that in this case Syllabification is no longer blocked and applies. By retaining the notion of a nonblocking, repair-triggering constraint, however, we are left with the expanded typology of constraints. Under the current analysis, there is another option: namely, segments must be SYLLABICALLY licensed postlexically, in addition to moraicly licensed. I suggest that the requirement of syllabic licensing takes precedence over the bimoraic limit. Consequently, Syllabification applies to satisfy the first constraint; but since the second constraint is still in force, it triggers Closed-Syllable Shortening (34). In this way both constraints are satisfied, without having to treat one of them as 'repair-triggering' only. We end up with essentially the same output as in (28), with the difference that onsets are linked to moras rather than syllables. This in itself requires a modification of the constraint on branching moras: the left ('strong') mora can branch, but the right ('weak') mora cannot.

Paradis (1988) claims that there is a hierarchy of constraints which depends on their focus: METRICAL > SYLLABIC > SKELETAL > SEGMENTAL. The constraint

which is higher in the structure takes precedence over one which is lower; the phonology can create a violation of the lower constraint in order to satisfy the higher one, but will then repair the newly created violation. Both of our constraints involve the syllable, and it is not entirely clear which should a priori be higher on the scale; but it is not unreasonable to suppose that the syllabic licensing constraint has a syllabic focus, while the bimoraic limit has a skeletal focus (which in Paradis' framework corresponds to our mora). From this assumption it follows that licensing will take precedence over the bimoraic limit, and we have no need of a special category of 'repair-triggering' constraints. In the lexicon, since segments need be licensed only moraicly — which constraint has a skeletal focus as well — the two constraints are equal and neither can create a violation of the other. It so happens that moraic licensing can be accommodated by a structure-building operation without violating the bimoraic constraint, so that is what happens in (31).

The correlation between the lexicon and moras on the one hand, and syllables and the postlexical component on the other, is reminiscent of work on other languages. For example, Hyman and Byarushengo (1984) note that tonal rules in Haya refer to moras in the lexicon, but syllables postlexically. Similarly, Zec (1988) proposes that in Bulgarian Morification applies lexically and Syllabification postlexically. In Kashaya we require both to be active lexically (since, for example, Initial-Syllable Extrametricality and Rhythmic Lengthening both refer to syllables), but as we see in the next paragraph Morification is lexical only. This is consistent with the apparent postlexical primacy of syllables, both in Kashaya prosodic licensing and in the examples from these other languages.

Another advantage of this analysis is in the treatment of word-final extraprosodic consonants. Recall from section 4.1 that it was unclear how we could prevent newly visible consonants from causing Shortening, since they differed from word-internal CVVC codas only in whether they had been lexically syllabified; postlexical Weight by Position ought to be applicable to both structures. The current approach makes the distinction easy: word-internal codas are always morified, since they are visible to the lexical Morification rule; word-final codas, however, are invisible to Morification as well as Syllabification, so they exit the lexicon without moras. If Morification applies only lexically, then when the extraprosodic consonant becomes visible, it has no way to acquire its own mora. Syllabification is still applicable (as it must be to syllabify word-internal CVVC codas anyway), and it joins the final C to the mora of the preceding vowel, but is unable to provide a new mora, and no Shortening occurs. Consider the word *moma*·<y>, where lexically the final /y/ is invisible; when it becomes visible postlexically, it simply links to the preceding mora without any Shortening:



This satisfies both moraic and syllabic licensing. Postlexically the constraint on branching weak moras is also turned off, so that this structure is permitted.

5. Conclusion

I have argued that the interaction of Closed-Syllable Shortening and Accent Placement in Kashaya tells us about two aspects of phonological theory. First, it provides evidence in favor of Zec's (1988) approach to syllable structure. This is support for Archangeli's (1989) claim that Syllabification and Weight by Position are separate rules which can act independently, since in Zec's framework

Morification and Syllabification are in fact separate. Also implicit in Zec's theory, as well as other work, is the possibility of moraic licensing, which the present analysis confirms. Second, the appeal to constraints which normally block rules that would violate them but in certain cases can be violated and trigger repair strategies, as advocated by Paradis (1988), makes possible a more insightful treatment of the Kashaya facts.

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