# Syntax and Prosody in Kashaya Phrasal Accent

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## 1 Introduction

Kashaya is an endangered language of northern California, a member of the Pomoan family. Its intricate metrical system has been analyzed in a number of previous works (Oswalt 1961, 1988, Buckley 1994a,b, 1997), but the main focus of these analyses has always been on word-internal patterns. The works have recognized that the placement of accents can make reference to multiple words — i.e., that metrical structure is potentially created across multiword phrases — but there has been little research into the nature of these phrases. In this paper, we investigate phrasal prosodic groupings as diagnosed by accent placement, including the especially interesting case of mismatches with syntactic structure. We argue that prosodic considerations, such as a preference for a branching phrase with two prosodic words and an avoidance of phrase-final accent, can override the matching alignment of prosodic and syntactic constituency.

We use the following terminology. A STRESS is a metrical prominence assigned by foot structure; an ACCENT is a tone associated with some metrical prominences. The domain in which feet are created is a prosodic phrase or P-PHRASE, which may consist of just one or of several words.

## 2 Kashaya Foot Structure

A modern analysis of Kashaya stress is given in detail by Buckley (1994a,b); what follows is a brief summary. Stress is assigned by iambic feet constructed left to right, with iambic lengthening of stressed open syllables.

| | | |
|---|---|---|
| (1) a. | ( *mo mú·* ) ( *li c'e·* ) *du* | 'run in circles' |
| b. | ( *ca dú·* ) ( *ce dun* ) | 'while looking' |
| c. | ( *kél* ) ( *mu la·* ) *du* | 'peer around' |

Stems that are disyllabic or longer (including all prefixed roots) show extrametricality of the first syllable. Here the roots are /*cʰuli*/, /*qaʔc'aṭ*/ compared to monosyllabic /*mo*/, /*cad*/, /*kel*/ in (1).

| | | |
|---|---|---|
| (2) a. | < *cʰu* > ( *li cí·* ) *du* | '(tide) goes out' |
| b. | < *qaʔ* > ( *c'a ṭá·* ) ( *du ce·* ) *du* | 'used to cry and cry' |
| c. | < *qaʔ* > ( *c'áṭ'* ) ( *kʰe tʰin* ) | 'shouldn't cry' |

In addition, foot extrametricality, notated « », applies to a foot of the shape CVV(C). When the first metrical sequence is CVV.CV, it surfaces as CV.CVV by a process termed Foot Flipping, and the resulting iamb is similarly extrametrical. (See Buckley 1994b, 1997 for two different analyses.)

| | | |
|---|---|---|
| (3) a. | « *wa·* » ( *dúʔ* ) ( *bem* ) | 'could walk away' |
| b. | < *duʔ* > « *ya·* » ( *qán'* ) ( *qa ba* ) | 'after thinking about it' |
| c. | < *lo* > « *q'o·* » ( *cíʔ* ) ( *tʰuʔ*) | 'don't make noise by moving around!' |
| d. | < *lo* > « *q'o ca·* » ( *du wá·* ) *du* | 'making noise by moving around' |

This foot extrametricality is cumulative with syllable extrametricality; combined with a following branching foot, the stress can fall as far in as the fifth syllable, as in (3d) where the underlying root is /loq'o·c/.

The examples so far show stress applied to a single word, but stress is often calculated across multiple words — the focus of this paper. The next examples illustrate two-word groupings with various possibilities of syllable and foot extrametricality; each such grouping is a p-phrase.

| | | |
|---|---|---|
| (4) a. | *ma qáʔc'aṭem* | you + when.cry |
| | ( *ma qáʔ* ) ( *c'a ṭem* ) | 'when you cry' |

| | | |
|---|---|---|
| b. | *cila qáʔc'aʔ* | long.time + cry |
| | < *ci* > ( *la qáʔ* ) ( *c'aʔ* ) | 'cried a long time' |
| c. | *ʔima·ta q'óʔdi* | woman + good |
| | < *ʔi* > « *ma·* » ( *ta q'óʔ* ) *di* | 'good woman' |

Phrasal stress typically falls on the first syllable of the second word in the p-phrase, due to the basic metrical structure. Most often phrasal stress can be observed clearly when we find a disyllable with an initial extrametrical syllable and a light final syllable; then the stress falls on the next syllable (initial in the following word) regardless of its weight. A similar pattern holds when a light monosyllable (necessarily without extrametricality) groups with the next word. But word-initial stress is not the only possibility, thanks to the effect of extrametricality on a CVV foot. If such a foot occurs as the first visible element, and is final in a word, then the stressed foot begins on the next syllable. If that word has a light initial syllable, stress falls on the second syllable of the second word.

| | | |
|---|---|---|
| (5) a. | *mi· bacúla·li* | there + jump.down |
| | « *mi·* » ( *ba cú* ) ( *la·* ) *li* | 'jumped down there' |
| b. | *qʰaba· mimáyiʔ* | cloud + be.ready |
| | < *qʰa* > « *ba·* » ( *mi má* ) ( *yiʔ* ) | 'it's ready to rain' |
| c. | *ʔihya· baṭíta·du* | bone + lying |
| | < *ʔih* > « *ya·* » ( *ba ṭí* ) ( *ta·* ) *du* | 'bones were lying (under there)' |

These examples are provided to emphasize that feet are truly constructed across the two words, and stress is not merely assigned to the first syllable of the second word.

To emphasize the phrasal structure, we now shift our representations away from the indication of foot structure to the indication of prosodic phrasing; henceforth parentheses indicate p-phrases, and feet and extrametricality must be inferred by the reader. All the examples in (6) show grouping of a noun with a following adjective within the noun phrase, with various stress locations due to the role of closed syllables and long vowels.

| | | | |
|---|---|---|---|
| (6) a. | ( *naṭa* *qáwi* ) | | 'small child' |
| | [ [child]$_N$ [small]$_A$ ]$_{NP}$ | | |
| b. | ( *duhṭʰál* *qawi* ) | | 'small sickness' |
| | [ [sickness]$_N$ [small]$_A$ ]$_{NP}$ | | |
| c. | ( *ʔihya·* *báhṭʰe* ) | | 'big bone' |
| | [ [bone]$_N$ [big]$_A$ ]$_{NP}$ | | |
| d. | ( *ʔihya·* *qawí* ) | | 'small bone' |
| | [ [bone]$_N$ [small]$_A$ ]$_{NP}$ | | |

(6a) has syllable extrametricality with the stress falling on a branching foot /*ṭaqa*/ that spans the words. (6b) has syllable extrametricality with the stress on a non-branching foot /*ṭʰa*l/ within the first word. (6c) has both syllable and foot extrametricality, and the stress occurs on a non-branching foot /*bah*/. Finally, (6d) also has syllable and foot extrametricality but with stress on a branching foot, which is the entire word /*qawi*/.

## 3 The Data

Our statistical data are drawn from Oswalt (1964), a collection of 82 texts, mainly from two speakers; a few illustrative examples here come from other sources. We exclude sung passages, which often follow a different prosodic pattern and may alter vowel length. Based on Oswalt's punctuation, the texts contain 5,154 sentences (demarcated by periods) and 9,996 intonational phrases (marked with tonal diacritics). Each intonational phrase can contain multiple p-phrases for accent; see below. According to the use of spaces, there are an estimated 41,356 prosodic words, excluding 3,896 clear occurrences of clitics that are written separately but always group prosodically with the preceding word. This count of prosodic words includes monosyllables that may be verbs or nouns, but most often are pronouns or other function words that normally are prosodically

dependent on an adjacent word. The patterns are too complex to distinguish lexical and function words without individual tagging, so accents on monosyllables are not discussed below.

Explicit accent marks reveal 11,435 p-phrases in the texts. Many p-phrases lack a surface accent due to ACCENT SUPPRESSION, or the non-realization of a stressed syllable as accented. Although the limits on possible foot structure permit us to infer the presence of certain unaccented p-phrases in the texts, in many other cases the location of additional p-phrases is ambiguous; consequently we rely here exclusively on p-phrases indicated by explicit accent marks. P-phrases in which the accent falls on the first word do not reliably indicate whether a following unaccented word is grouped with it (since that second word might be an independent p-phrase with a suppressed accent). Counting only accent placements that are best explained by grouping the accented word in a p-phrase with the preceding word, we identified 2,462 multiword prosodic groupings. These p-phrases were then classified according to the lexical categories and syntactic relations of the words grouped together.

In longer sentences, clear grouping effects can often be seen, with a general preference for binary p-phrases.

(7) a. ( *buṭaqá ʔem* ) ( *pʰala cóhtoʔ* ) ( *bihše qʰáʔdiw* )
[ bear SUBJ ] [ again leave ] [ deer fetch ]
'the bear went off again and fetched deer meat'
b. ( *qʰaṭʰá wi* ) ( *ʔahqʰa báhṭʰe* ) ( *cʰulíbiw* )
[ beach at ] [ water big ] [ flow ]
'at the beach, the water had ebbed way out'

(7a) divides the sentence into three groups: noun+determiner, adjunct+verb, object+verb. Each p-phrase exhibits syllable extrametricality, with the accent falling on the following branching foot. (7b) again shows the typical pattern of two-word grouping, but includes the one-word phrase /*cʰulíbiw*/ with an overt accent rather than suppression or grouping with the previous phrase.

Within the verb phrase, the head is normally final in the matrix clause, and always final in any subordinate clause (Olsson 2010). When a subject immediately precedes the verb, it can group with it, or can phrase separately.

(8) a. ( *ʔihcʰe díbucaʔ* ) 'rain fell'
[ [rain]$_{NP}$ [fall]$_{VP}$ ]$_{IP}$
b. ( *ʔihcʰe* ) ( *dibucí·dem* ) 'when rain falls'
[ [rain]$_{NP}$ [fall]$_{VP}$ ]$_{IP}$

This variation is at least partly related to word length, as discussed below. The lack of accent on the subject in (8b) may serve to avoid a degenerate foot in *<ʔih>(cʰé)*.

Similarly, an object can phrase with the following verb (9) or be accented separately (10).

(9) a. ( *ʔohso dúqʰayaʔte·* ) 'let's go gather clover'
[ [clover]$_{NP}$ [gather]$_{V}$ ]$_{VP}$
b. ( *maʔa bímuyiʔ* ) '(they) eat food'
[ [food]$_{NP}$ [eat]$_{V}$ ]$_{VP}$
(10) a. ( *bahša* ) ( *duqʰayá·c'in* ) '(they) gather buckeyes'
[ [buckeye]$_{NP}$ [gather]$_{V}$ ]$_{VP}$
b. ( *maʔa* ) ( *bimuyíʔ* ) '(they) eat food'
[ [food]$_{NP}$ [eat]$_{V}$ ]$_{VP}$

Adjuncts can be found grouped with a verb (or with another adverbial: see (18)), or they can group separately.

(11) a. ( *pʰala cóhtoʔ* ) 'left again'
[ [again]$_{Adv}$ [left]$_{V}$ ]$_{VP}$
b. ( *pʰala* ) ( *cumáʔ* )
[ [again]$_{Adv}$[were pounded]$_{V}$ ]$_{VP}$ 'also were pounded'

This variation in the grouping of the subject, object, and adverbial with a following verb shows the role of optionality in p-phrase creation. We turn next to examples in which that optionality includes grouping a subpart of a syntactic constituent with another word to the exclusion of the rest of its own constituent.

## 4 Mismatches

Based on syntactic constituency, we expect words in a complex NP to group together, not with the verb, as in (12).

(12) a. ( *ʔama·* *q'óʔdi* ) ( *t'án'qaw* ) 'was happy'
[ [[thing]$_N$ [good]$_A$ ]$_{NP}$ [felt.SG]$_V$ ]$_{VP}$
b. ( *qʰaʔbe* *hádu·* ) ( *dihciyíc'ba* ) 'after picking up another rock'
[ [ [rock]$_N$ [other]$_A$ ]$_{NP}$ [having picked up]$_V$ ]$_{VP}$

However, similar phrases sometimes match syntax, and sometimes do not, as this near-minimal pair illustrates.

(13) a. ( *ʔihcʰe* *míhsaʔ* ) ( *dibucín'kʰe* ) 'a heavy rain will fall'
[ [ [rain]$_N$ [heavy]$_A$ ]$_{NP}$ [will fall]$_{VP}$ ]$_{IP}$
b. ( *ʔihcʰe* ) ( *mihsáʔ* *dibuʔ* ) 'a heavy rain fell'
[ [ [rain]$_N$ [heavy]$_A$ ]$_{NP}$ [fell]$_{VP}$ ]$_{IP}$

The adjective in (13b) fails to group with the noun that it modifies. Instead, it starts a p-phrase containing itself and the verb.

This mismatch pattern can occur whether the NP is in the subject (14a,b) or object (14c) position.

(14) a. ( *ʔahqʰa* ) ( *baḥtʰe* *cʰúliwe·* ) 'the tide flowed out'
[ [ [water]$_N$ [big]$_A$ ]$_{NP}$ [flowed]$_{VP}$ ]$_{IP}$
b. ( *ʔahca* ) ( *qawi* *cóhto·li* ) 'where a little house was standing'
[ [ [house]$_N$ [small]$_A$ ]$_{NP}$ [stand.LOC]$_V$ ]$_{VP}$
c. ( *ʔama·* ) ( *q'oʔdi* *t'ác'qan* ) 'feeling happy'
[ [ [thing]$_N$ [good]$_A$ ]$_{NP}$ [while feeling.PL]$_V$ ]$_{VP}$

While the p-phrase boundaries in (12) align with the syntactic boundaries, in (14) the second element of the NP groups prosodically with the verb.

Possessive determiners, which appear before the noun, also mainly appear grouped prosodically with their complements.

(15) a. ( *miʔkʰe* *míhya* ) 'my neck'
[ [my]$_D$ [neck]$_{NP}$ ]$_{DP}$
b. ( *tiʔkʰe* *bíhše* ) 'her meat'
[ [her]$_D$ [meat]$_{NP}$ ]$_{DP}$
c. ( *yaʔkʰe* *cáhno* ) 'our language'
[ [our]$_D$ [language]$_{NP}$ ]$_{DP}$

But mismatches are attested when the possessed noun groups with following verb.

(16) a. ( *tiʔkʰe* ) ( *maʔa* *dút'atan'ba* ) 'having prepared his food'
[ [ [his]$_D$ [food]$_{NP}$ ]$_{DP}$ [having prepared]$_V$ ]$_{VP}$
b. ( *tiʔkʰe* ) ( *ʔima·ta* *híyaʔtamuʔdo·* ) 'they say he is sharing his wife'
[ [ [his]$_D$ [wife]$_{NP}$ ]$_{DP}$ [share.QUOT]$_V$ ]$_{VP}$

We have found evidence for further mismatches, such as noun compounds (see (32)). The general

analysis we propose below is applicable to all such patterns.

In summary, p-phrases generally respect the syntax: members of syntactic constituents are likely to be grouped together prosodically. However, as the examples above show, prosody-syntax mismatches do occur in that one member of a syntactic constituent might be placed in a different p-phrase. It should be noted that the mismatch appears to go only one way: prosodic words are pulled rightward into p-phrases, not leftward, as schematized in (18).

(17) [ωω] [ω] → (ω) (ωω)
[ω] [ωω] → *(ωω) (ω)

For instance, we can find no examples of a subject and an object grouping together before an explicitly accented verb, [S][OV] → (SO)(V), where we expect the object and the verb to be closer syntactically. However, we certainly find examples of two adverbs forming a single p-phrase in front of a verb:

(18) ( *pʰala* *ʔáca·* ) ( *moma·duʔ* ) ‘arrived home running’
[ [again]$_{Adv}$ [to home]$_{Adv}$ [run as far as]$_{V}$ ]$_{VP}$

The apparent lack of subject-object grouping before a verb may, however, be due to a gap in the data, since fully expressed subject-object-verb is uncommon.

## 5 Syntax–Prosody Alignment

We outline an analysis in Optimality Theory that includes a constraint on p-phrase alignment with syntactic phrases; it competes with purely prosodic constraints, and the two possible rankings of these constraints create the variant outcomes. The alignment constraint follows the work of Selkirk (1995) and Truckenbrodt (1995, 1999).

(19) ALIGN-XP-R
For each XP there is a P such that the right edge of XP coincides with the right edge of P.

This is the main constraint giving a role to syntactic structure in our analysis; note that only lexical, not functional XP’s appear subject to such constraints. WRAP-XP, proposed by Truckenbrodt as a complement to ALIGN-XP — requiring that every XP be fully contained in a single p-phrase — does not seem to play a crucial role in Kashaya and is assumed to be low-ranked under either grammar. ALIGN-XP,L is also low-ranked.

If alignment is satisfied, we should not find mismatches of the sort that are presented above. What constraints cause the mismatches? As one component we require constraints on the binarity of p-phrases (adapted from Selkirk 2000).

(20) a. BIN-MAX
A p-phrase consists of at most two prosodic words.
b. BIN-MIN
A p-phrase consists of at least two prosodic words.

The simple BINARY constraint has to occur in these MAX and MIN versions because single-word phrases are clearly attested, whereas three-word phrases, though difficult to verify in Kashaya because of accent suppression, do seem to be avoided more rigorously.

For the constraint that most directly opposes ALIGN-XP, however, we propose one that prefers the right-branching prosodic structure (ω)(ωω) over left-branching (ωω)(ω). These both violate BIN-MIN once, so the binarity constraints cannot distinguish them. The constraint is defined at the IP (Intonational Phrase) level, immediately above the p-phrase.

(21) BRANCH-R
The final p-phrase of an IP is branching.

This result can be considered a kind of iambic rhythm at the p-phrase level, corresponding to the iambic feet of Kashaya; but in the next section we also consider alternative pressures that may be responsible for this pattern.

With these basic tools, we can generate the fundamental variation in phrasing found in Kashaya. One grammar has high-ranked alignment, so prosody matches syntax. Here right-alignment with NP prevents grouping with V. The examples are schematized from (13); a single IP is assumed in all candidates.

(22)

| $[[rain]_N\ [heavy]_A]_{NP}\ [fall]_{VP}$ | ALIGN-XP,R | BIN-MAX | BIN-MIN | BRANCH-R |
|---|---|---|---|---|
| a. (*rain*) (*heavy*) (*fall*) | | | **!* | * |
| b. ☞ (*rain heavy*) (*fall*) | | | * | * |
| c. (*rain*) (*heavy fall*) | *! | | * | |
| d. (*rain heavy fall*) | *! | * | | |

The alternate grammar, which exists in variation with the first, has ALIGN-XP ranked below BRANCH-R as well as the BIN constraints. This forces a larger prosodic constituent at the right edge and so prosody overrides syntactic alignment. BIN-MAX prevents a single p-phrase for the entire VP, and crucially dominates BIN-MIN.

(23)

| $[[rain]_N\ [heavy]_A]_{NP}\ [fall]_{VP}$ | BIN-MAX | BIN-MIN | BRANCH-R | ALIGN-XP,R |
|---|---|---|---|---|
| a. (*rain*) (*heavy*) (*fall*) | | **!* | * | |
| b. (*rain heavy*) (*fall*) | | * | *! | |
| c. ☞ (*rain*) (*heavy fall*) | | * | | * |
| d. (*rain heavy fall*) | *! | | | * |

It is not possible to account for the variation simply by treating ALIGN-XP and BRANCH-R as two adjacent unranked constraints, because the ranking of BIN-MIN is also crucial. In simple two-word clauses, alignment would force creation of two p-phrases if it dominated either BIN-MIN or BRANCH-R, so ALIGN-XP cannot vary in ranking with just one of them, but rather must be ranked below both of them in the second grammar.

(24)

| $[\ [food]_{NP}\ [eat]_V\ ]_{VP}$ | ALIGN-XP,R | BIN-MAX | BIN-MIN | BRANCH-R |
|---|---|---|---|---|
| a. ☞ (*food*) (*eat*) | | | ** | * |
| b. (*food eat*) | *! | | | |

(25)

| $[\ [food]_{NP}\ [eat]_V\ ]_{VP}$ | BIN-MAX | BIN-MIN | BRANCH-R | ALIGN-XP,R |
|---|---|---|---|---|
| a. (*food*) (*eat*) | | *!* | * | |
| b. ☞ (*food eat*) | | | | * |

The ranking of BIN-MAX is less clear, as noted above, and is not crucial in these short examples; but we have placed it adjacent to BIN-MIN for explicitness. We turn now to alternative explanations for the effect that we have attributed in this section to BRANCH-R.

## 6 Conspiracy Against Final Accent?

We ask here whether the variation in Kashaya might be explained by gradient pressures of various types. In particular, accents close to the end of a p-phrase are disfavored, in an effect akin to the well known preference for final lapses expressed by constraints such as RHYTHM (Hung 1994) and LAPSE-AT-END (Kager 2001). Because Kashaya stress is calculated from the left edge of a p-phrase, the longer the p-phrase the less likely the accent will occur close to the end of that phrase — which, as the rightmost p-phrase, is also at the end of the higher IP constituent. This means that the "iambic" structure (ω)(ωω), with two words on which to calculate the rightmost accent, is less likely to yield an accent at the end of the IP than the alternative (ωω)(ω) with a short final p-phrase. The right-branching prosodic grouping, therefore, can serve to avoid IP-final accents, a

position in which they overlap with the intonational contours that occur independently at the right edge of an IP (Oswalt 1961). The general avoidance of this overlap may have arisen because the accent is less perceptible when it occurs too close to the intonational boundary tone. Before considering the effect on p-phrase constituency in more detail, however, we present evidence supporting the claim that final accents are avoided in Kashaya. Space limitations prevent more detailed discussion of the numerical results outlined here.

The first phenomenon is **accent retraction**, whereby the accent falls further to the left than is predicted by the stress rules. It is quite restricted in its context. Formally, it consists of a revocation of foot extrametricality so that the accent falls on the foot that ought to be extrametrical, thereby moving the accent away from (near-) final position. Notice in (26a) that the foot /*no·*/ is normally extrametrical, but in (b) it takes the accent instead.

(26) a. < *cah* > « *no·* » ( *dún* ) ( *s'em* ) ‘must have been talking’
b. < *cah* > ( *nó·* ) ( *dam* ) ‘the one talking’

This retraction applies optionally — there are numerous examples of final accent that could have been avoided by leftward movement to a CVV foot — but when it does occur it is highly correlated with avoidance of final accent. Out of 225 tokens of retraction that we identified in our corpus, 189 of them (84.0%) would otherwise have final accent, because the CVV foot is followed by a single word-final foot, whether branching or not.

Another, quite straightforward means of avoiding accent on a final syllable is **accent suppression**, mentioned in section 3. This lack of a realized accent in a p-phrase often seems to occur with short words that are not grouped with another word to form a larger accentual domain, in which case any overt accent would tend to be final. To test whether accent suppression applies preferentially when the accent would fall on the final syllable, we need to compare the expected occurrence of accents on a particular syllable (based on longer words where word-finality does not arise) to observed final accents in shorter words where that syllable position is also final. This table summarizes our results.

(27)

| Accented syllable | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Attested Final (O) | 16.3% | 17.9% | 4.3% | 1.5% |
| Attested Nonfinal (E) | 26.3% | 38.8% | 10.8% | 4.9% |
| O/E | 0.62 | 0.46 | 0.40 | 0.30 |

Consider the case of third-syllable accent. On accented words with four or more syllables, 38.8% have accent on the third syllable; thus, counting from the left edge of the word, third-syllable accent is rather common. This is no surprise, given syllable extrametricality and a branching iambic foot. But on three-syllable words, accent on the third syllable is less than half as frequent, just 17.9% of such words (a ratio of 0.46). The difference is that in these shorter words, that third-syllable accent is also final, and therefore there must be a greater application of accent suppression when the accent would otherwise be final.

These figures make the simplifying assumption that what matters is finality in a prosodic word, which will often also be final in a p-phrase and the IP. But returning to the main theme of this paper, word-final accent can also be prevented by **prosodic grouping**, i.e., combining that word with the one that precedes it into a p-phrase. We can evaluate this idea by looking at two- and three-syllable words. Due to Kashaya's left-to-right footing and initial-syllable extrametricality, they are quite likely to have final stress if they are phrased independently (28a), whereas bringing a short preceding word into the p-phrase shifts the accent away from the right edge, often putting it on the word-initial syllable (28b).

(28) a. *bimuyíʔ* eat.PL
< *bi* > ( *mu yíʔ* ) ‘(they) ate’
b. *maʔa bímuyiʔ* food + eat.PL
< *ma* > ( *ʔa bí* ) ( *mu yiʔ* ) ‘(they) ate food’

If avoidance of final accent is a true motivation for prosodic grouping, then we predict that shorter words are more likely to group with a preceding word, and longer words (which less often would have final accent) are more likely to remain ungrouped. This includes, for example, a short verb that pulls in the preceding word to avoid final accent on the verb (which itself is usually final in the clause, and therefore in the p-phrase). This tendency is strongest among two-syllable words: 77.1% have final accent if they stand alone, illustrating the less favored outcome; but 36.7% of the time that they bear any accent (when we can evaluate their grouping), they do so as the second member of a p-phrase, where it is almost always initial in the word and therefore avoids final accent. Among three-syllable words, the undesired outcome is less likely and so the solution is less necessary: 37.0% bear final accent if standing alone, and 22.7% bear (non-final) accents by virtue of grouping as the second member of a p-phrase. This pressure is lowest for longer words: for example, a four-syllable word bears final accent only 6.2% of the time, and is grouped with a preceding word 16.2% of the time it is accented at all. The last figure perhaps reflects a kind of baseline rate for prosodic grouping, since it is similar to that found with five- and six-syllable words, which can rarely or never receive final accent. In these cases, the grouping motivation may come from the preceding word, which is vulnerable to final accent if it remains in its own p-phrase.

As this overview shows, the pressure against phrase-final accents can show its effect in several ways: simple suppression of the accent, retraction onto a preceding foot when available, or constituting the p-phrases so that the accent is not final. Notably, this last effect may at least partly explain the existence of mismatches between the syntax and prosody. If a verb or other phrase-final word needs a single preceding word to avoid final accent, it may take that word from out of another syntactic constituent to serve a prosodic purpose. The pair of sentences in (13) illustrates this point quite nicely; the shorter verb *dibuʔ* groups with the preceding word, since otherwise it would have final accent, but longer *dibucín'kʰe* stands alone with penultimate accent.

Not all instances of mismatches, however, involve short final words, in which the alternative phrasing would lead to an actual final accent; for example, the verbs in (16) are long enough to stand alone and yet pull the preceding word out of its DP. Nevertheless, this non-categorical avoidance of final accents may be the historical pressure (and possibly a synchronic one) that is responsible for the surprising mismatch pattern, which was phonologized as something akin to our proposed BRANCH-R. Another possible factor is that in simple cases, a one-word DP commonly groups with the verb, and this general pattern may have lead to a tolerance for such binary groupings even when the preverbal word is not a full DP and a mismatch occurs.

## 7 Syllabification Across Words

We discuss here a rather different factor that also appears to favor the grouping of two words in one p-phrase. Many lexical roots and enclitics begin with a LARYNGEAL INCREMENT /*h*/ or /*ʔ*/ that syllabifies as a coda with a preceding word-final vowel, yielding a heavy syllable that attracts stress (Oswalt 1986, Buckley 1992). A similar situation occurs with enclitics that begin with two consonants, namely /*ltow*/ 'from, out of' and the animate plural /*yya*/.

| | | | |
|---|---|---|---|
| (29) | a. | ( *qawi* *yáʔ* ) | 'the small man' |
| | | small AGT | |
| | b. | ( *qawí* *yya* ) | 'a few small men' |
| | | small PL | |
| (30) | a. | ( *ʔahqʰa* *pʰímaqam* ) | 'they must have crossed the water' |
| | | water cross.PL.RESPONSIVE | |
| | b. | ( *ʔahqʰá* *ʔq'otiyihe* ) | 'to get a drink of water' |
| | | water drink.INTENTIVE | |

The statistical data show that a closed syllable from across-word syllabification increases the frequency of realization of accent on that syllable, even if that vowel is already the expected location of accent in a branching foot. For example, the common discourse element *mens'iba* 'having done so' can take final stress by virtue of an extrametrical syllable and a branching foot. But in fact, accent is explicitly marked on it mainly when the final syllable is closed by a following increment. In the 342 unaccented tokens of this element, 97.7% are followed by CV, so the syllable is open,

as in (31a); but of the 31 in which that vowel is accented, 93.5% are followed by an increment, as in (31b) — in fact, we have only two tokens of this word accented when it is followed by CV.

(31) a. *mens'iba ʔul* ‘having already done so’
*< men > ( s'i ba ) ( ʔul )*
b. *mens'ibá ʔdo* ‘having done so, they say’
*< men > ( s'i báʔ ) do*

This effect cannot be attributed just to the presence of a closed syllable, but rather is related to the derived status of the syllable. This can be seen by comparing accents on word-final syllables in the context VC#C, where the final C comes from inside the lexical word, and those in the context V#CC, where the coda comes from a following word or clitic. Accent on V#CC (occurring 33.6% of the time) is more than twice as likely as accent on VC#C (occurring 15.4%), even though the basic syllable structure and word position would appear to be identical.

The asymmetry can also lead to mismatches in the syntax and prosody, as when the second element of a noun compound is split off to form a p-phrase with the cluster-initial clitic that follows it (32b), rather than a single p-phrase where the clitic combines with the compound (32a).

(32) a. *( qʰaʔbe ʔácac' em )* ‘Rock Man (SUBJ)’
[ [ [rock]$_N$ [man]$_N$ ]$_N$ [SUBJ]$_D$ ]$_{DP}$
b. *( qʰaʔbe ) ( ʔimó ltow )* ‘from a cave’
[ [ [rock]$_N$ [hole]$_N$ ]$_N$ [from]$_P$ ]$_{PP}$

We propose that syllabification across words makes p-phrase grouping more likely, and this accounts for the difference in accent realization. The word-final accent in V#CC is not final in the p-phrase, due to this grouping; consequently it is more likely to be realized because it is not in conflict with final-accent avoidance, and phenomena such as accent suppression have reduced motivation to intervene.

Why should syllabification across a word boundary encourage p-phrase grouping? We appeal to the notion of crisp alignment, a requirement that prosodic edges align “crisply” down through the prosodic hierarchy (Itô and Mester 1994). Specifically, coda syllabification of a word-initial consonant disrupts the alignment of the syllable and prosodic word (*ʔi.mol.tow*) with the syntactic word (*ʔimo*). A p-phrase in this location cannot simultaneously satisfy alignment with the syntactic word (ALIGN-XP) and with the prosodic word (CRISP-EDGE). By abandoning this location for a p-phrase boundary, i.e., by grouping the elements together, crisp alignment is maintained. We have already seen that ALIGN-XP is violable, and MAX-BIN may, at least some of the time, discourage combining three elements in one p-phrase, and so mismatches can arise when across-word syllabification leads to prosodic grouping for reasons independent of syntactic structure.

## 8 Conclusion

Kashaya iambic footing often occurs across words, and the location of accent is the primary evidence of this phrasing. Word groupings typically follow the syntactic constituency of those words, but sometimes the rightmost two words are grouped regardless of their syntactic relation. This indicates some non-syntactic pressure, such as the pure structural constraint BRANCH-R, but the data also reveals more general pressures on the avoidance of final accent. Phrasal grouping is just one strategy for avoiding such patterns, along with accent suppression and retraction. Across-word syllabification also encourages grouping in order to satisfy crisp edge-alignment of prosodic categories; this is not directly caused by accent assignment, but has important consequences for accent due to its effect on final accent avoidance. It does not appear, however, that the gradient pressures are sufficient to account for all instances of right-branching structures, since there are cases of over- and under-application. Under current theories, the gradient pressures against final accents, and similarly the non-categorical preference for crisp alignment, are not easy to integrate with the variable ranking of BRANCH-R that we proposed in section 5. What we can be sure of, however, is that in Kashaya prosodic factors (sometimes) outrank syntax and lead to mismatches in the alignment of these categories.

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