Syntax and Prosody in Kashaya Phrasal Accent

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Outline of talk

• Kashaya stress patterns
• phrasal groupings as diagnosed by accent
  – including mismatches with syntactic structure
• constraint on branching prosody
• role of final accent avoidance
  – encourages certain phrasal groupings
• role of syllabification across words
  – also encourages phrasal grouping
• prosody over syntax
Pomoan family

Northern
Central
Southern
Kashaya
Northeastern
Eastern
Southeastern
California
Iambic lengthening of stressed open syllables

- 'run in circles’
  ( mo mí· ) ( li c’e· ) du
- 'while looking’
  ( ca dú· ) ( ce dun )
- ‘jerk one’s foot back’
  ( tíc ) ( ci ce· ) du
Syllable extrametricality

- disyllabic or prefixed roots permit extrametricality
  /qahmat-/, /qaʔc’at-/ 

<qah> ( ma tí· ) ( bic’ ) ( biw )
‘must have been mad’

<qaʔ> ( c’a ťá· ) ( du ce· ) du
‘used to cry and cry’

<qaʔ> ( c’áť’ ) ( kʰe tʰin )
‘shouldn’t cry’
Foot extrametricality

\[<wa\cdot>(\ d\ddot{u}\?\ ) (\ bem\ )\]
‘could walk away’

cumulative with syllable extrametricality

\[<du?> <ya\cdot>(\ q\ddot{a}n\‘\ ) (\ qa\ ba\ )\]
‘after thinking about it’

\[<ho> <t’o\ ta\cdot>(\ la\ mé\‘\ ) (\ du\ )\]
‘lower one’s head’

“Foot Flipping” of CVV.CV \(\rightarrow\) extrametrical CV.CVV
– accent can be as far right as 5\textsuperscript{th} syllable
Footing across words

• no extrametricality
  ma qáʔc’aṭem ‘when you cry’
  (ma qáʔ) (c’aṭem)

• syllable extrametricality
  cila qáʔc’aʔ ‘cried a long time’
  <ci> (la qáʔ) (c’aʔ)
Footing across words

• foot extrametricality
  \textit{mi· bacúla·li} ‘jumped down there’
  \texttt{< mi·>} (ba cú) (la·) li

• syllable plus foot extrametricality
  \textit{ʔima·ta q’ó?di} ‘good woman’
  \texttt{< ?i > < ma·>} (ta q’ó?) di
Terminology

• **P-PHRASE** = *prosodic phrase*
  – domain of foot construction

• **STRESS**
  – a metrical prominence assigned by foot structure

• **ACCENT**
  – a tone associated with some metrical prominences
  – many, but not all, p-phrases have an accent

• **ACCENT SUPPRESSION**
  – non-realization of a stressed syllable as accented
Our corpus

• published collection *Kashaya Texts* (Oswalt 1964)
  – two primary speakers, but four others also represented
  – 148 printed pages of Kashaya (with facing English)

• original audio recordings for most of the texts
  – varying quality but mostly pretty good
  – a few of the examples in this talk are drawn from Oswalt’s elicitation recordings and his unpublished dictionary
Content of corpus

• 5,154 “sentences” based on Oswalt’s punctuation
  – simple presence of periods in the Kashaya transcription

• 9,996 intonational phrases
  – falling ^ (careful, well thought-out)
  – rising ` (interrogative and “Responsive”)
  – level ‾ (neutral)

• about 41,356 “words”
  – orthographic units excluding 3,896 reliable enclitics
  – other small function words don’t reliably group with a word on either side
    • so can’t treat globally, left as independent words
    • but we exclude monosyllables in statistics given below
Accents in corpus

- 11,435 accented vowels
  - i.e., explicit accent marks in transcription
  - this number, and our discussion, excludes brief sung passages
- we have coded 2,462 multiword prosodic phrases
  - only when the evidence for grouping is relatively clear
    - when an unexpected location of accent is explained by grouping
  - subject to additions and corrections
( buţaqáʔem ) ( pʰala cóhtoʔ ) ^ ( bihše qʰáʔdiw ) ^
[ bear SUBJ ] [ again leave ] [ deer fetch ]
‘The bear went off again and fetched deer meat’

( mens’i·líʔdom ) ( šahqo pʰóʔom? ) ( qahqo bálṭʰe ) ( miṭi·li ) ^
[ doing EVID ] [ grasshopper burn ] [ opening big ] [ lie-LOC ]
‘then he burned grasshoppers in a large hole’

( ó· ) ( naţa yáʔ ) ( pʰiʔk’oʔel ) ( moʔón’ )
[ oh ] [ boy AGT-SUBJ ] [ ball OBJ ] [ strike ]
‘Oh! The boy hit the ball!’
Noun + Adjective

( naṭa qáwi ) ‘small child’
[ [child]_N [small]_A ]_{NP}

( duhtʰál qawi ) ‘small sickness’
[ [sickness]_N [small]_A ]_{NP}

( ṭiḥya· báḥṭʰe ) ‘big bone’
[ [bone]_N [big]_A ]_{NP}

( ṭiḥya· qawí ) ‘small bone’
[ [bone]_N [small]_A ]_{NP}
Word order within VP

• verb phrase is normally head-final (Olsson 2010)
  
  duwęʔ cohto·y  ‘I saw him leave yesterday’
  
  \[\text{[yesterday]}_{\text{Adv}} \ [\text{leave}]_{v}\]

• suffix /e·/ is used for evidential verbs when not final in the sentence
  
  cohtó·ye· duweʔ  ‘I saw him leave yesterday’
  
  \([\text{leave}]_{v} \ [\text{yesterday}]_{\text{Adv}}\]

• accentual implications are not clear
  
  – lack of accent on following word could be due to grouping with the verb, or to suppression
  
  – certainly the following word is sometimes accented independently, i.e. not phrased with the verb
Subject + Verb

• subject preceding verb can group with it

( ?ihcʰe díbucaʔ ) ‘rain fell’

[ [rain] NP [fall] VP ] IP

• or can phrase separately

( ?ihcʰe ) ( dibucí·dem ) ‘when rain falls’

[ [rain] NP [fall] VP ] IP
Object + Verb

• similarly, object can phrase with verb

(ʔohso dúqʰayaʔte·) ‘let’s go gather clover’

[ [clover]_{NP} [gather]_{V} ]_{VP}

• or separately

(bahša)(duqʰayá·c’in) ‘(they) gather buckeyes’

[ [buckeye]_{NP} [gather]_{V} ]_{VP}
Object + Verb

• with verb

( maʔa bímuyíʔ ) ‘(they) eat food’

[ [food]_{NP} [eat]_{V} ]_{VP}

• separately

( maʔa ) ( bimuyíʔ ) ‘(they) eat food’

[ [food]_{NP} [eat]_{V} ]_{VP}
Grouping of adverbs

- can group with a verb
  \[
  ( p^hala \, \text{cóhto?} \, ) \quad \text{‘left again’}
  \]
  \[
  [ \, [\text{again}]_{\text{Adv}} \, [\text{left}]_{\text{V}} \, ]_{\text{VP}}
  \]

- or another adverbial
  \[
  ( p^hala \, ?áq^h\text{a·} \, ) \quad \text{‘back to the shore’}
  \]
  \[
  [ \, \ldots \, [\text{again}]_{\text{Adv}} \, [\text{to water}]_{\text{Adv}} \, \ldots \, ]_{\text{VP}}
  \]
Complex NPs

• based on syntactic constituency, we expect words in a complex NP to group together, not with V

( qʰaʔbe hádu· ) ( dihciyíc’ba )


‘after picking up another rock’
Mismatches

• similar phrases might sometimes match syntax ...

\[(\text{ʔihc}^{h}e \text{mîhsa?}) (\text{dibucín’k}^{h}e)\]
\[
[ [\text{rain}]_{N} [\text{heavy}]_{A}]_{NP} [\text{will fall}]_{VP}]_{IP}
\]
‘a heavy rain will fall’

• and sometimes not

\[(\text{ʔihc}^{h}é) (\text{mihsá? dibu?})\]
\[
[ [\text{rain}]_{N} [\text{heavy}]_{A}]_{NP} [\text{fell}]_{VP}]_{IP}
\]
‘a heavy rain fell’
Pitch comparison

(ʔihcʰe míhsa?) (dibucín’kʰe)
(ʔihcʰé) (mihsá? dibu?)
Similar contrast

• NP as p-phrase

( ṭama· q’ó?di ) ( t’án’qaw )

‘was happy’

• A + V as p-phrase

( ṭama· ) ( q’o?di t’ác’qan )

‘feeling happy’
More N + Adj mismatches

• subject is separated from its modifier

(ʔahqʰa) (bahṭʰe cʰúliwe·)

[ [ [water]_N [big]_NP [flowed]_VP ]_IP

‘the tide flowed out’

• object similarly

(ʔama·) (q’o?di t’ác’qan)

[ [ [thing]_N [good_A]_NP [while feeling-PL]_VP ]_VP

‘feeling happy’
Second element of NP with V

- default N + A order, here A groups with verb
  
  (`ʔahca`) (`qawi cóhto·li`)  
  ‘where a little house was standing’

- marked A + N order, here N groups with verb
  
  (`hadu·`) (`ʔaca? nóhpʰowalli`)  
  ‘where other people were living’
Possessive determiners

- possessive determiners mainly appear grouped with their complements

( miʔkʰe míhya ) ‘my neck’
\[
\text{[ [my]_D [neck]_{NP} ]_{DP}}
\]

( tiʔkʰe bíhše ) ‘her meat’
\[
\text{[ [her]_D [meat]_{NP} ]_{DP}}
\]

( yaʔkʰe cáhno ) ‘our language’
\[
\text{[ [our]_D [language]_{NP} ]_{DP}}
\]
Excluded determiners

• but possessed noun can group with following verb

( tiʔkʰe ) ( maʔa dút’atan’ba )
[ [ [his]_D [food]_NP ]_DP [having prepared]_V ]_VP
‘having prepared his food’

• similarly:

( tiʔkʰe ) ( ?ima·ta hiyaʔtamuʔdo· )
[ [ [his]_D [wife]_NP ]_DP [shares-EVID]_V ]_VP
‘they say he is sharing his wife’
Summary of findings

• syntax is generally respected
  – members of constituents are more likely to be in one p-phrase
• but syntax-prosody mismatches do occur
  – one member of a constituent placed in a different p-phrase
• the mismatch appears to go only one way
  – PrWds are pulled rightward, not leftward
    • $[\omega \omega]_{XP} [\omega]_{XP} \rightarrow (\omega) (\omega\omega)$
    • $[\omega]_{XP} [\omega\omega]_{XP} \rightarrow *(\omega\omega) (\omega)$
  – e.g., no examples of (SO) (V)
    • yet definitely find (Adv Adv) (V)
    • though full $[S][OV]$ is not very common, so few test cases
Syntax-prosody alignment

• Optimality Theory analysis
  – edges of p-phrases aligned with edges of XPs
  – following Selkirk, Truckenbrodt, and many others

• ALIGN-XP-R
  – right edge of p-phrase aligns with right edge of XP
  – this is main constraint giving a role to syntactic structure

• WRAP-XP
  – every XP is fully contained within a p-phrase
    • proposed by Truckenbrodt as a complement to ALIGN-XP
  – doesn’t seem to play a crucial role in Kashaya
Binarity constraints

• **Bin-Max**
  – p-phrase contains a maximum of two prosodic words
  – prevents three or more PrWds in a phrase
  – status of such larger groupings is difficult to determine
    • due especially to variation and accent suppression

• **Bin-Min**
  – p-phrase contains a minimum of two prosodic words
  – penalizes unpaired prosodic words
  – but these definitely do occur
A prosody constraint

• misalignment of prosody and syntax
  – something prefers prosodic structure \((\omega)(\omega\omega)\)
  – perhaps a kind of iambic rhythm at the p-phrase level
• **BRANCH-R**
  – the final p-phrase of an IP is branching
  – we’ll consider alternatives as well
• variation in phrasing
  – occurs due to higher or lower ranking of ALIGN-XP
  – relative to this and the binarity constraints
## High-ranked alignment

<table>
<thead>
<tr>
<th></th>
<th>ALIGN-XP,R</th>
<th>BIN-MAX</th>
<th>BIN-MIN</th>
<th>BRANCH-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (rain) (heavy) (fall)</td>
<td></td>
<td></td>
<td><strong>!</strong>*</td>
<td>*</td>
</tr>
<tr>
<td>b. (rain heavy) (fall)</td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>c. (rain) (heavy fall)</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>d. (rain heavy fall)</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

- right-alignment with NP prevents grouping with V
  - prosody matches syntax
- also dominates \textsc{Bin-Min}
  - otherwise two-word phrases will never be split
Low-ranked alignment

<table>
<thead>
<tr>
<th></th>
<th>BIN-MAX</th>
<th>BIN-MIN</th>
<th>BRANCH-R</th>
<th>ALIGN-XP,R</th>
</tr>
</thead>
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<tr>
<td>a. (rain) (heavy) (fall)</td>
<td>*<em>!</em></td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. (rain heavy) (fall)</td>
<td>*</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ☞ (rain) (heavy fall)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>d. (rain heavy fall)</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
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- **BRANCH-R** forces larger prosodic constituent at the right
  - prosody overrides syntactic alignment
- **BIN-MAX** prevents a single p-phrase for the entire VP
  - unclear whether sometimes violated due to other constraint(s)
## Alignment >> Binarity

<table>
<thead>
<tr>
<th>[ [food]<em>{NP} [eat]</em>{V} ]_{VP}</th>
<th>ALIGN-XP,R</th>
<th>BIN-MAX</th>
<th>BIN-MIN</th>
<th>BRANCH-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a..food (food) (eat)</td>
<td></td>
<td></td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>b. (food eat)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- in this grammar, **ALIGN-XP dominates BRANCH-R**
  - this ensures a p-phrase boundary before the verb
- also dominates **BIN-MIN**
  - otherwise two-word phrases will never be split
- shows that we can’t just have **ALIGN-XP** and **BRANCH-R** locally unranked
Binarity >> Alignment

<table>
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<td></td>
<td></td>
<td></td>
<td>*</td>
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</tbody>
</table>

- in this grammar, ALIGN-XP is ranked lower
  - allows BIN-MIN to force a single grouping
- but are there alternatives to BRANCH-R?
  - in particular, an appeal to forces other than the branching structure
Conspiracy against final accent?

• but perhaps it’s not grammar competition
  – instead might be gradient pressures of various types
• accents close to the end of a p-phrase are disfavored
  – akin to the well known preference for final lapses
  – *RHYTHM* (Hung 1994), *LAPSE-AT-END* (Kager 2001)
• strategies in Kashaya
  – retraction to previous foot
  – suppression of final accent
  – grouping in a p-phrase
Retraction

• a rather direct form of final-accent avoidance
  – move the accent leftward
  – but only in a specific configuration

• formally, revocation of foot extrametricality
  – accent falls on foot that ought to be extrametrical
  – moves accent away from (near-)final position
Optional retraction

- foot extrametricality, as expected
  \(<\text{cah}> <\text{no}·>(\text{dún})(\text{s’em})\)
  ‘must have been talking’

- retracted from final syllable
  \(<\text{cah}> (\text{nó}·)(\text{dam})\)
  ‘the one talking’

- syllable extrametricality with long root /cahno-/ 
  - long vowel derived from elision of /cahno-ad-/
Retraction to avoid final accent

- applies optionally
- but highly correlated with avoidance of final accent
  - out of 225 tokens of retraction
  - 189 of them (84%) would otherwise have final accent
- how often does foot extrametricality yield final accent?
  - quick estimate, based on 4th and 5th syllable accents
    - since they occur only by virtue of foot extrametricality
  - 83 final out of 159 such accents (52%)
  - so not randomly applying to eligible accents
Suppression of final accent

• suppression is another way to eliminate a final accent
  – this often seems to occur with short words that are not grouped
  – compare observed to expected final accents

• OBSERVED final accents
  – e.g., third-syllable accents on all 3-syllable words
  – calculate percent of words of length $n$ that have final accent

• EXPECTED frequency of accents on that syllable
  – based on percent third-syllable accents on 4–7 syllable words
  – if strictly determined from the left edge, length should not matter
Avoidance of final accent

<table>
<thead>
<tr>
<th>Accented syllable</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attested Final (O)</td>
<td>16.3%</td>
<td>17.9%</td>
<td>4.3%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Attested Nonfinal (E)</td>
<td>26.3%</td>
<td>38.8%</td>
<td>10.8%</td>
<td>4.9%</td>
</tr>
<tr>
<td>O/E</td>
<td>0.62</td>
<td>0.46</td>
<td>0.40</td>
<td>0.30</td>
</tr>
</tbody>
</table>

- observed final accents
- expected frequency of accents on that syllable
  - since O/E is much lower than 1, length does play a role
    - suppression of accents that would otherwise be word-final?
    - or bias in the creation of p-phrases ...
Grouping to avoid final accent

• 2–3 syllable words are liable to have final accent
  – if they occur alone, or as first element in p-phrase
    • details depend on root length and closed syllables
  – for example, bimuyíʔ ‘(they) ate’

• also the most likely to be grouped with preceding word
  – usually then initial accent, avoiding a final accent
  – for example, maʔa bímuyiʔ ‘(they) ate food’

• a broad pattern in the corpus
Grouping to avoid final accent

<table>
<thead>
<tr>
<th>Syllables in word</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accented alone</td>
<td>1691</td>
<td>1939</td>
<td>1225</td>
<td>377</td>
<td>100</td>
</tr>
<tr>
<td>If accented alone, then final accent</td>
<td>77.1%</td>
<td>37.0%</td>
<td>6.2%</td>
<td>1.9%</td>
<td>—</td>
</tr>
<tr>
<td>Accented in p-phrase</td>
<td>981</td>
<td>571</td>
<td>236</td>
<td>84</td>
<td>20</td>
</tr>
<tr>
<td>If accented at all, then second in p-phrase</td>
<td>36.7%</td>
<td>22.7%</td>
<td>16.2%</td>
<td>18.2%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

- 2 and 3 syllable words are much more likely to have a final accent if they are not prosodically grouped
  - as in *(maʔa)* *(bimuyí?)*
- this is something to be avoided
Grouping to avoid final accent

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- 2 and 3 syllable words are also more likely to be the second element in a p-phrase
  - as in (maʔa bímuyiʔ)
- this moves the accent leftward, away from the final syllable
Interim conclusion

• final accent disfavored
  – possibly gradient, i.e. not just against absolute final accent

• multiple strategies to avoid final accent
  – move it leftward by retraction
  – suppress the accent
  – group words together so accent won’t be final
    • rather than, or in addition to, structural BRANCH-R ?

• next, another cause of phrasal grouping
  – syllabification across words
Syllabification across words

• many lexical roots begin with a “laryngeal increment”
  /hsibo/ ‘three’, /hla·li/ ‘maybe’, /-hce-/ ‘obstruct’
  /ʔs’uš-/ ‘be pointed’, /-ʔyo-/ ‘gather’, /-ʔdayac-/ ‘fail to do’

• some enclitics also have initial clusters
  plurals /hca/, /yya/
  postpositions /hlaw/ ‘until, as far as’, /ltow/ ‘from, out of’

• initial C syllabifies as coda with preceding V
  hiʔbayá hca ‘men’

• deletes after an obstruent
  ninéʔ ca ‘elders’
Syllabification across words

- closed syllable from across-word syllabification increases occurrence of accent
  - example of mens’iba ‘having done so’
  - expect final stress, <men>(s’ibá)

- 342 unaccented, 97.7% followed by CV
  - open mens’iba ?ul ‘having already done so’
  - just 3 /hC/, 5 /ʔC/

- 31 accented, 93.5% followed by CCV
  - closed mens’ibá ?do ‘having done so, they say’
  - just 2 not followed by increment
Closed syllables and accent placement

( qawi yáʔ ) ‘the small man’
  small AGT

( qawí yya ) ‘a few small men’
  small PL

( ?ahqʰa hóʔ mu·kito ) ‘he gave him water’
  water give him

( ?ahqʰáʔ q’oc’qa mu·kito ) ‘he gave him water’
  water drink.CAUS him
Accents on derived closed syllables

<table>
<thead>
<tr>
<th></th>
<th>Word-Final Accent</th>
<th>No Final Accent</th>
<th>Percent Final Accent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final VC#C</td>
<td>1,701</td>
<td>9,357</td>
<td>15.4%</td>
</tr>
<tr>
<td>Final V#CC</td>
<td>425</td>
<td>840</td>
<td>33.6%</td>
</tr>
<tr>
<td>Final open</td>
<td>575</td>
<td>13,850</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

• types of final VC
  – V#CC with coda from following word or clitic
  – VC#C from final C from inside lexical word

• accent more likely in V#CC than VC#C
  – in fact, more than twice as likely
Mismatch due to V#CC

• elements of N compound in same p-phrase

( qʰaʔbe ?ácac’ em )


‘Rock Man (SUBJ)’

• second element of N compound split off

( qʰaʔbe ) ( ?imó ltow )


‘from a cave’
Hypothesis

• syllabification across words makes p-phrase grouping more likely
• a word-final accent then is not final in the p-phrase
  – therefore more likely to be realized
  – because not in conflict with final-accent avoidance
• if correct, this skew in frequency is indirect evidence for (ωω) groupings
  – compare to empirically similar (ω)(ω) with suppression
  – but without disfavored final accent on the first p-phrase
Crisp edges

• prosodic boundaries align “crisply”
  – down through the hierarchy (Ito & Mester 1994)

  p-phrase  (   ) (   )
  syllable [   ] [   ] [   ] [   ] [   ] [   ] [   ]

• across-word syllabification can disrupt this pattern
  – if coda is not from the same p-phrase as the preceding V

  p-phrase  (   ) (   )
  syllable [   ] [   ] [   ] [   ] [   ] [   ] [   ] [   ] [   ]
Conflicting alignments

• noncrisp edge )C.
  – p-phrase at word boundary

  * ( qʰaʔ.ʔeʔí.mo ) ( 1.tow )

• crisp edge C.)
  – but p-phrase not at word boundary

  * ( qʰaʔ.ʔeʔí.mo l. ) ( tow )

• preference for p-phrase to align with some morphosyntactic edge appears to rule out this crisp solution
Avoiding the problem

• noncrisp edge )C.
  – p-phrase at word boundary

* ( qʰaʔ.be ʔí.mo ) ( l.tow )

• crisp edge elsewhere
  – p-phrase at different word boundary

( qʰaʔ.be ) ( ʔi.mó l.tow )

• in the attested form, the p-phrase does align with a morphosyntactic edge
• but leads to a mismatch with the syntactic constituency
Summary: V#CC

• p-phrase boundaries avoid locus of across-word syllabification
  – crisp edge-alignment of prosodic categories
• not directly motivated by accent assignment
  – but important consequence for accent
Conclusions

• Kashaya iambic footing often occurs across words
  – location of accent is primary evidence of phrasing
• word groupings typically follow syntactic constituency
  – but sometimes the rightmost two words are grouped regardless of their syntactic relation
• indicates some non-syntactic pressure
  – possible role for pure structural constraint such as BRANCH-R
  – but also more general pressures on avoidance of final accent
    • phrasal grouping is just one strategy
  – across-word syllabification also encourages grouping
• prosodic factors (sometimes) outrank syntax
References