Global Effects in Kashaya Prosodic Structure

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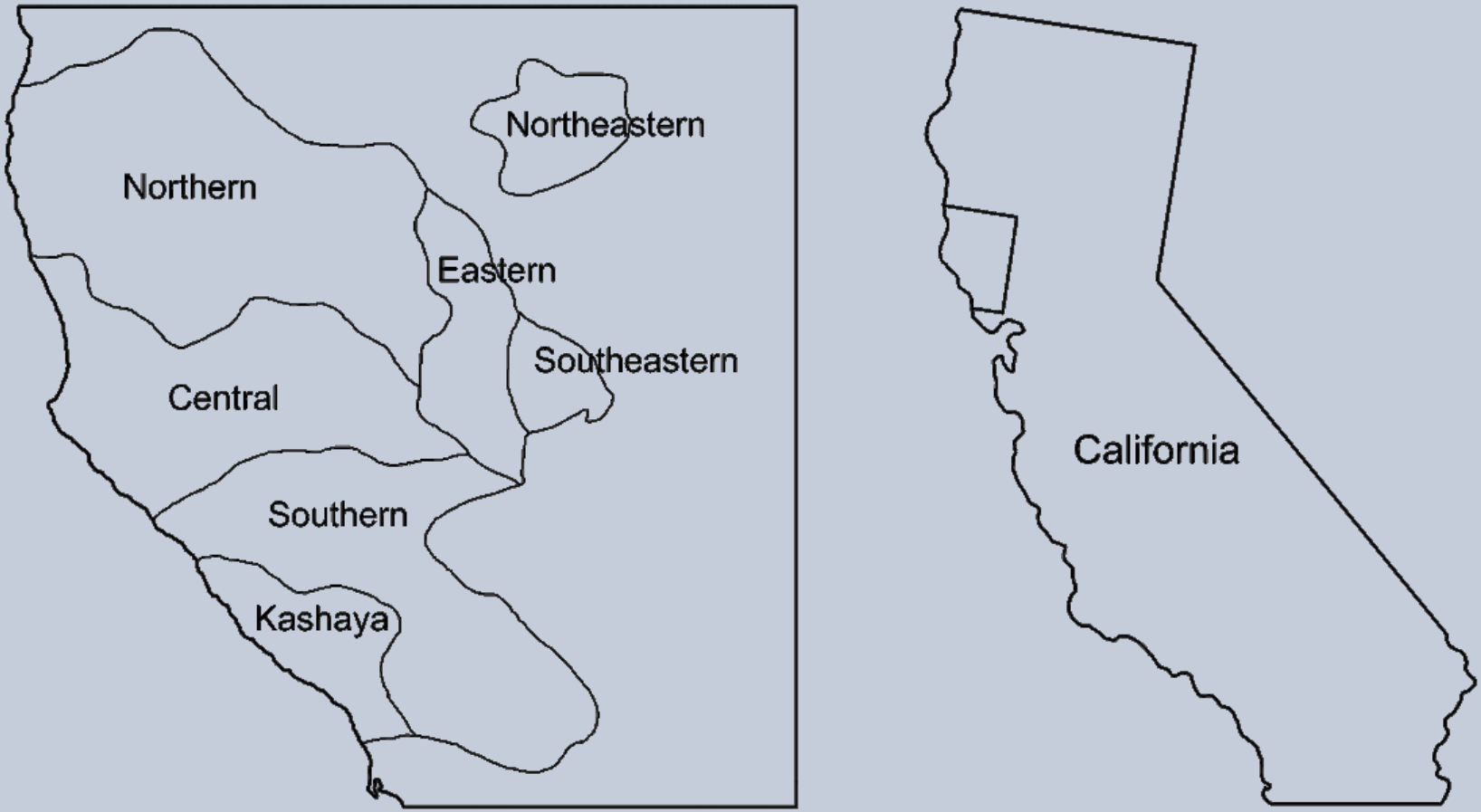
Outline of talk

- Kashaya stress patterns
  - interactions with morphological structure
- Lexical Phonology and a cross-level effect
  - dividing the process in half with ordered operations
- a global approach in OT
  - Classic OT and Constraint Domains
- approaches in Stratal OT
  - dividing the process in half (again)
  - a global effect in syllabification
  - phonologically conditioned stem allomorphy
- Distributed Morphology
  - getting a peek at the next suffix?
- Optimal Interleaving
  - serial representations with global evaluation

Pomoan family



LR iambs and Lengthening

- data from Oswalt (1961, 1964) and dictionary manuscript
- morphological bracketing plays an important role later; roots in bold

[[**mo**-mul-ic'-ed] u]
(mo mú·) (li c'e·) du
'run in circles'

[[**cad**-uced] in]
(ca dú·) (ce dun)
'while looking'

[[**ti**-cc-iced] u]
(tíc) (ci ce·) du
'jerk one's foot back'

[[**kel**-mul-ad-uced] u]
(kél) (mu la·) (du ce·) du
'keep peering around'

Syllable extrametricality

- occurs only in disyllabic or prefixed roots (Buckley 1994)
- blocked by minimality for monosyllabic roots

[[ca-**qʰam**-ala-w-ibic] ʔ]
⟨ca⟩ (qʰa má·) (la wi·) (biʔ)
'start to cut downward'

[[**qaʔc'aṭ**-ad-uced] u]
⟨qaʔ⟩ (c'a ṭá·) (du ce·) du
'used to cry and cry'

[[**qaʔc'aṭ**] ʔkʰe] tʰin
⟨qaʔ⟩ (c'áṭ') (kʰe tʰin)
'shouldn't cry'

[[pi-**hset'**-ibic-ed] u]
⟨pih⟩ (se t'í·) (bi ce·) du
'(hair) kept springing up'

Foot extrametricality

- applies to initial **Cv·** foot
- long vowel can be underlying or derived by elision

[[**di·c'**-id] ba]
《di·》(c'ín') ba
'after having said'

[[**wa**-ad] uʔba-em]
《wa·》(dúʔ) (bem)
'could walk away'

[**cu·se**-to-ʔna]
《cu·》(se tóʔ) na
'at our uncle's house'

[di·-**k'aš-k'aša**]
《di·》(k'áš) (k'a ša)
'leaning'

Plus syllable extrametricality

- "initial" **Cv·** relative to syllable extrametricality, if present
- therefore cumulative when root is disyllabic or prefixed

[[du-**ʔya·q**-ad-qa] ba]
⟨duʔ⟩ ⟪ya·⟫ (qán') (qa ba)
'after thinking about it

[[ba-**ne**-aduc-qa] ·li]
⟨ba⟩ ⟪ne·⟫ (dúc^{h}) (qa·) li
'when (they) sent it off in the distance'

[[**šula·m**] iʔba]
⟨šu⟩ ⟪la·⟫ (máʔ) ba
'would get sick'

[[qa-**de**-ibic-qa-wac'] in]
⟨qa⟩ ⟪de·⟫ (bíc^{h}) (qa wa·) (c'in)
'when they tried prying'

Foot Flipping

- initial **Cv·Cv → CvCv·**
- results in a "perfect iamb", which is also extrametrical

[[**t'e·t**-ibic] ba]
《t'e ti·》(bíc') ba
'having stood up'

[[**ca**-ad-uced] u]
《ca du·》(ce dú)
'flies along'

[[**mo**-ala-wad-adad] u]
《mo la·》(wa dá·) (da du)
'run down intermittently'

[[**di·c'**-id-uwad-uced] u]
《di c'i·》(du wá·) (du ce·) du
'he used to tell (this story)'

Plus syllable extrametricality

- cumulative, just like plain foot extrametricality
- as a result, accent can fall as far in as the 5th syllable

[[**loq'o·c**-ad-uwad] u]
⟨lo⟩ ⟪q'o ca·⟫ (du wá·) du
'make noise by moving around'

[[si-**de**-ac'-iyic'] in]
⟨si⟩ ⟪de c'i·⟫ (yi c'ín)
'while they were sailing along'

[[**muna·c**-id] iʔba]
⟨mu⟩ ⟪na ci·⟫ (dúʔ) ba
'would be shy'

[[**bide**-aloq-ic'] ti]
⟨bi⟩ ⟪da lo·⟫ (qóʔ) ti
'in order to carry them back up here'

Level ordering

- fundamental structure of a Kashaya verb

  [[[**t'e·t**]$_{ROOT}$ ibic]$_{STEM}$ ba]$_{WORD}$

- "Level 1" = Stem Level suffixes
  - a verb can contain many such suffixes, but sometimes none
    - directionals, inceptives
    - reflexive, reciprocal
    - causative
    - duratives, distributive
- "Level 2" = Word Level suffixes
  - every verb requires one slot to be filled, chosen from several categories
    - absolutive
    - evidentials
    - imperatives
    - modals
    - switch reference
  - a few other suffixes can precede or follow this slot

Stem-level phenomena

- changes in vowel length
  - Iambic Lengthening, Foot Flipping, Elision
  - all exemplified below
- Sonorization of /c/ to /y/ preceding /ic/
  - e.g. /tubic-ic'/ → /tubiyic'/ 'get oneself up'
  - does not occur with Word-level suffixes
- "Decrement" or deletion of laryngeal increments /h, ʔ/
  - triggered by several classes of suffixes
    - e.g. /bahcu-ibic/ → /bacu·bic/ 'jump up'
  - but all are in the Stem level
- possibly several others
  - Aspirate Dissimilation
  - Height Harmony
  - depends on exact formulation of the processes

No word-level Lengthening

- Stem Level suffixes undergo Lengthening and Flipping
- Word Level suffixes do not undergo either process

[[**mo**-mac-ed] ela]
(mo má·)(ce de) la
'I keep running in there'
* (mo má·)(ce de·) la

[[**t**-ala-mec'] tʰi-pʰila]
(ta lá·) (meʔ) (tʰi pʰi) la
'if (you) don't climb back down'
* (ta lá:) (meʔ) (tʰi pʰi·) la

[[**hoṭʰ**-ala] s'uw-em]
(ho ṭʰá·) (la s'u) (wem)
'it would warm (us) up'
* (ho ṭʰá·) (la s'u·) (wem)

[[**s'i**-yic'] ʔcid-tʰi-mi-ya-em]
(s'i yíʔ) (ciʔ) (tʰi mi) (yam)
'they never used to do (that)'
* (s'i yíʔ) (ciʔ) (tʰi mi·) (yam)

No word-level Lengthening

- this is true even in the main-stress syllable
- syllable extrametricality of course affects the location of feet

[[**s'i**] p^{h}ila]
(s'i p^{h}í) la
'if it happens'
* (s'i p^{h}í·) la

[[**cad**] ela]
(ca dé) la
'I see (it)'
* (ca dé·) la

[[**bawil**] ela]
⟨ba⟩ (wi lé) la
'I am putting (it) in'
* ⟨ba⟩ (wi lé·) la

[[ca-**hke**] wi-ya-e·]
⟨cah⟩ (ke wí) (ye·)
'it blocked me from sitting'
* ⟨cah⟩ (ke wí·) (ye·)

Elision and vowel length

- V+V produces a long vowel when both are within the Stem

  [[**bane**-aduc] ʔ]
  ⟨ba⟩ ⟪ne·⟫ (dúʔ)
  'send away'

- but a short vowel when at least one is outside the Stem

  [[**cahno**] inna-em]
  ⟨cah⟩ (nón) (nam) * ⟨cah⟩ ⟪non⟫ (nám)
  'I heard someone singing'

- this evidence is a bit subtle
  - a long vowel in a closed syllable regularly shortens
  - but it opaquely undergoes Foot Extrametricality

  [[**siwi·c**] meʔ]
  ⟨si⟩ ⟪wic^{h}⟫ (méʔ) * ⟨si⟩ (wíc^{h}) (meʔ)
  'hang! (pl)'

No word-level Flipping

- Foot Flipping occurs only if the entire **Cv·Cv** is located in the Stem
- otherwise the **Cv·** remains a nonbranching (and extrametrical) foot

[[**q'a·**] mela]
《q'a·》(me lá)
'I left'

* 《q'a me·》(lá)

[[**sima·q**] eti]
〈si〉《ma·》(qa tí)
'although he's asleep'

* 〈si〉《ma qa·》(tí)

[[qa-**ṭ'o·**] wi-ya-e·]
〈qa〉《ṭ'o·》(wi yé·)
'rubbed off (my skin)'

* 〈qa〉《ṭ'o wi·》(yé·)

[[šo-**ṭ'o·**] t^hi-p^hila]
〈šo〉《ṭ'o·》(t^hi p^hí) la
'if (you) don't peel it'

* 〈šo〉《ṭ'o t^hi·》(p^hi lá)

Word vs. Stem suffixes

- the Stem Level suffix undergoes Foot Flipping
- but not the Word Level suffix under the same syllable configuration

[[**q'a·**] mela]
《q'a·》(me lá)
'I left'

[[**sima·q**] eti]
〈si〉《ma·》(qa tí)
'although he's asleep'

[[qa-**ṭ'o·**] wi-ya-e·]
〈qa〉《ṭ'o·》(wi yé·)
'rubbed off my (skin)'

[[**q'a·**-cid] u]
《q'a ci·》(dú)
'keep leaving'

[[**sima·q**-ad] u]
〈si〉《ma qa·》(dú)
'usually sleep'

[[qa-**ṭ'o·**-cid-uced] u]
〈qa〉《ṭ'o ci·》(du cé·) du
'be peeling with the teeth'

- a degenerate foot such as *(dú)* is permitted when necessary
- so this cannot be what causes avoidance of Flipping in the Word level

No Flipping before CVC

- since Flipping applies to **Cv·Cv**, it is blocked in **Cv·CvC**
- this is true even fully within the Stem Level

[[**q'a**·-cid] ba]
《q'a·》(cín') ba
'after leaving'

[[**sima·q**-ad] t^h-e]
〈si〉《ma·》(qáʔ) t^he
'can't sleep'

[[qa-**ṭ'o**·-cid] t^hu] ʔ
〈qa〉《ṭ'o·》(cíʔ) (t^huʔ)
'don't peel (it)!'

[[**q'a**·-cid] u]
《q'a ci·》(dú)
'keep leaving'

[[**sima·q**-ad] u]
〈si〉《ma qa·》(dú)
'usually sleep'

[[qa-**ṭ'o**·-cid-uced] u]
〈qa〉《ṭ'o ci·》(du cé·) du
'be peeling with the teeth'

- Flipping has to apply only within the Stem Level suffixes
- but whether **CvC** blocks Flipping depends on the Word Level suffixes

Ordering analysis of Lengthening

- apply Lengthening to the Stem
  - only Stem level suffixes are present at this point

  [**hoṭʰ**-ala]

  (ho ṭʰá·) la

- then add the Word level suffixes without Lengthening
  - new suffixes do not undergo the process

  [[(hoṭʰá·)la] s'uw-em]

  (ho ṭʰá·) (la s'u) (wem)

- this approach can be implemented in Lexical Phonology (Buckley 1994)
  - and in any serial theory that permits an intermediate representation of the Stem to which phonological processes apply

Final extrasyllabicity

- extrasyllabic final C in Stem to permit Lengthening there

  [**mo**-mul-ic'-ed]
  (mo mú·) (li c'e·) d′

- necessary since often ends up as an open syllable due to Word suffix

  [[**mo**-mul-ic'-ed] u]
  (mo mú·) (li c'e·) du 'run in circles'

- if the syllable ends up closed, it will shorten again independently

  [**mo**-mul-ic'-ed]
  (mo mú·) (li c'e·) d′

  [[**mo**-mul-ic'-ed] ba]
  (mo mú·) (li c'en') ba 'after running in circles'

- so here, look-ahead is not crucial; but Flipping is more complicated...

Look-ahead for Flipping

- when we see just the Stem with extrasyllabicity, Flipping should apply

  [**q'a·** - cid]
  《q'a ci·》 d′

- but we can't predict whether we'll eventually have **CvC** or **Cv**

  [[**q'a·**-cid] ba]
  《q'a·》 (cín') ba
  'after leaving'

  [[**q'a·**-cid] u]
  《q'a ci·》 (dú)
  'keep leaving'

- and we can't just undo it by shortening, unlike with Iambic Lengthening

  [[**q'a·**-cid] ba]
  《q'a ci·》 d′ ba

  → 《q'a ci·n'》 ba

  → * 《q'a cin'》 (bá) ~ * (q'a cín') ba

Avoiding look-ahead

- Buckley (1994) splits the effect of Foot Flipping into two steps
  - first set the stage for Flipping by "CV Adjunction" to foot
  - full change implemented later only if syllable structure permits
  - converted here to a two-level analysis
- Stem Level: adjoin the **Cv** to **Cv·**, creating anti-iamb **Cv·Cv**

	[**q'a·** - cid]
Basic Footing	(q'a·) ci d′
CV Adjunction	(q'a· ci) d′

- Word Level: closed syllable destroys **Cv·Cv**, else Flipping occurs

[[**q'a·**-cid] ba]	[[**q'a·**-cid] u]
(q'a· ci) d ba	(q'a· ci) d u
《q'a·》(cin') ba	《q'a ci·》du

Lexical Phonology summary

- advantages
  - architecture captures Stem / Word distinction
  - Iambic Lengthening, CV Adjunction simply turn off
  - the general problem of opacity has an easy solution in ordered rules
- disadvantages
  - Flipping is split into two processes
    - temporary anti-iamb violates general pattern of language
    - more of a trick to get the facts to come out right?
  - makes no connection between Flipping and Lengthening
    - yet both are fundamentally about changes in vowel length
- classic Optimality Theory avoids the look-ahead problem
  - evaluates the output directly, with surface syllabification present
  - but requires some other means of identifying the lengthening suffixes
    - some domain equivalent to the Stem
    - or a long list of relevant morphemes

Constraint Domains

- Buckley (1996, 1997) proposes Constraint Domains
  - index constraints to particular substrings of the output
  - roughly the same as the morphological bracketing, but not nested

[[**sima·q**] eti]	[[**sima·q**-ad] u]
{ si ma· q }$_S$ { e ti }$_W$	{ si ma· qa d }$_S$ { u }$_W$
⟨si⟩《ma·》(qa tí)	⟨si⟩《ma qa·》(dú)

- ranking ensures that Word suffixes are faithful to underlying length
  - IDENT-LENGTH : the length of a segment is identical in input and output
  - *(CV·)CV or other FTFORM constraints that force Flipping to occur
  - IDENT-LENGTH$_{WORD}$ >> *(CV·)CV >> IDENT-LENGTH$_{STEM}$

Flipping with Stem vs. Word suffixes

[[**sima·q**-ad] u]

{sima·qad}$_S${u}$_W$	IDENT-L$_W$	*(CV·)CV	IDENT-L$_S$
a. si (ma·) (qa dú)		*!	
b. ☞ si (ma qa·) (dú)			**

[[**sima·q**] eti]

{sima·q}$_S${eti}$_W$	IDENT-L$_W$	*(CV·)CV	IDENT-L$_S$
c. ☞ si (ma·) (qa tí)		*	
d. si (ma qa·) (tí)	*!		*

- here Flipping causes two IDENT violations, unlike Buckley (1997)
- the difference is not crucial

Similar for Iambic Lengthening

[[**hoṭʰ**-ala] s'uw-em]

{hoṭʰala}$_S${s'uwem}$_W$		IDENT-L$_W$	SWP	IDENT-L$_S$
a.	(ho ṭʰá) (la s'u) (wem)		*!*	
b. ☞	(ho ṭʰá·) (la s'u) (wem)		*	*
c.	(ho ṭʰá·) (la s'u·) (wem)	*!		*

- SWP = STRESS-TO-WEIGHT PRINCIPLE : a stressed syllable is heavy
  - causes Iambic Lengthening, subject to two-mora maximum
- it may be possible to unify the constraints for Lengthening and Foot Flipping
  - cf. also PERFECT-IAMB or UNEVEN-IAMB: "a foot has the shape CvCv·"
  - those details may depend on the precise model being used
- Buckley (1997) used gradient foot alignment for Foot Flipping
  - favored expanding a foot rightward
  - this type is now often deprecated in favor of categorical constraints
    - Kager (2001), McCarthy (2003), Buckley (2009)

No look-ahead required

[[**q'a·**-cid] u]

{q'a·cid}$_S${u}$_W$	IDENT-L$_W$	*(CV·)CV	IDENT-L$_S$
a. (q'a·) (ci dú)		*!	
b. ☞ (q'a ci·) (dú)			**

[[**q'a·**-cid] ba]

{q'a·cid}$_S${ba}$_W$	IDENT-L$_W$	*(CV·)CV	IDENT-L$_S$
c. ☞ (q'a·) (cín') ba			
d. (q'a ci·n') (bá)			*!*
e. (q'a cin') (bá)			*!

- forms (d) and (e) would also be distinguished by a phonotactic constraint *v·C
- the main point is that they both lose

Constraint Domains summary

- advantages
  - IDENT-L connects Lengthening and Flipping
    - one indexed constraint for the Word level accounts for both
  - no need for look-ahead
    - the full output is evaluated at once
- disadvantages
  - stipulates Stem / Word distinction
    - laid on top of output, rather than part of architecture
  - has no inherent account for opacity
    - would require extra mechanisms just like Classic OT
  - this is a particular problem at the phrasal level
    - accentual feet are often constructed across two words
      - though there is considerable variation (Buckley & Gluckman 2012)
    - distinct from the lexical feet for Iambic Lengthening and Flipping

Lexical – Phrasal opacity

- there is no Flipping across phrases, just Foot Extrametricality

[[**baṭʰe·**]] [[ha-**soṭ**] i]
〈ba〉《ṭʰe·》(ha só) ṭi ‘scatter many handfuls!’
*〈ba〉《ṭʰe ha·》(so ṭí)

[[**ʔama·**]] [[ma-**cat**-ic’] in’]
〈ʔa〉《ma·》(ma cá) (ti·) (c’in’) ‘keep looking for things’
*〈ʔa〉《ma ma·》(ca tí·) (c’in’)

- yet the entire sequence /ṭʰe·ha/ or /ma·ma/ is in two Stem domains
  - so changes to vowel length there ought to be permitted
    - both vowels are subject to lower-ranking IDENT-LENGTH
    - *thanks to Paul Kiparsky for highlighting this issue*
  - can be solved by having Lexical vs. Phrasal components
    - in Phrasal component, Flipping is ruled out
    - now consider using ordered components to handle Stem vs. Word also

Stratal Optimality Theory

- fixed stages in derivation (Kiparsky, Bermúdez-Otero)
  - Stem, Word, Phrase
  - output of level *n* is input to level *n+1*
  - limited handling of opacity across strata
- assume each stage is internally global like Classic OT
  - candidates evaluated against constraint ranking

Stem Level	*morphology*	hoṭʰ-ala	
	output of Eval	(ho ṭʰá·) la	SWP >> IDENT-L
Word Level	*morphology*	(hoṭʰá·)la-s'uw-em	
	output of Eval	(ho ṭʰá·) (la s'u) (wem)	IDENT-L >> SWP

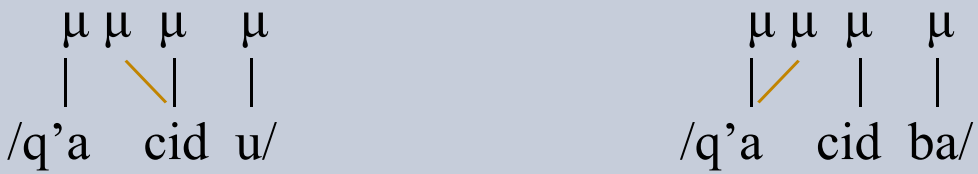
Stratal OT and globality

- stratum-internal globality won't help with the look-ahead problem
  - in this regard, it's exactly like Lexical Phonology
- still need some equivalent to CV Adjunction in the Stem level
  - but this is harder to manage with constraints than with a processual rule
  - predict Iambic Lengthening at the Word level if PERFECT-IAMB >> IDENT-L for Flipping

Stem Level	*morphology*	q'a·-cid	
	output of Eval	(q'a· ci) d′	PARSE-SYL >> FT-FORM (?)
Word Level	*morphology A*	(q'a·ci)d-u	
	output of Eval	(q'a ci·) (dú)	PERFECT-IAMB >> IDENT-L
or	*morphology B*	(q'a·ci)d-ba	
	output of Eval	(q'a·) (cín') ba	*V·C >> FT-FAITH

Flipping as mora linking

- Buckley (1997) argues for an underlyingly unlinked second mora
  - underspecification of an affiliation that varies depending on context
  - in the global C-domains approach, different from Lexical Phonology analysis
- Foot Flipping is then really a matter of linking left or right



  - it links rightward if it can, to make (CvCv·) = Flipping
  - if syllable structure blocks this, it links leftward for (Cv·)(CvC) = no Flipping
- in Stratal OT, when does this linking occur?
  - the analysis above assumes in the Stem level
  - but what if it's actually not until the Word level?
- idea: create a CvCv foot with a still-floating mora at the Stem level
  - linking occurs at Word level, once the following context is known

Mora linking in Stratal OT

- first, permit floating mora in (Cv$^{\mu}$Cv)
  - low-ranked PARSE-μ, high-ranked MAX-μ
- but also prevent rightward linking at the Stem
  - consonant-final /q'a$^{\mu}$-cid/ → /q'a·cin'ba/
    - syllabify /d/ in the coda, undo later if /q'aci·du/
    - don't permit coda processes to occur until Word level
  - vowel-final /mo-ala-/ → /mo·law/ 'to run down'
    - can't prevent by coda in Stem, yet doesn't undergo Flipping
- problem: Lengthening at Stem level predicts /mola·/
  - prevent (mo$^{\mu}$la·) by a limit of three moras in one foot
    - but normally this assumes association to syllable and foot structure
  - and what prevents simple (mola·) by rightward linking?
    - Iambic Lengthening can clearly add a mora at the Stem level
    - DEP-LINK: "if unlinked in input, must be unlinked in output"
  - therefore two rather dubious assumptions required
    - and is it still a trick, rather than capturing the real generalization?

Global syllabification

- constraint GLOBALSYL that looks at next-level output syllabification
  - penalize a segment whose syllable role is different from its later correspondent
- reference to the immediately following level (here the Word)
  - this permits Word/Phrase differences from syllabification across word boundaries
- an unsyllabified consonant satisfies the constraint vacuously
  - constraint looks only for **distinct** syllabification
  - but violates PARSE, so such candidates are preferred only when motivated

Stem: /q'a·-cid/	GLOBALSYL	PARSE	*(CV·)CV	IDENT-L
a. ☞ (q'a·) cid ←				
b. (q'a·) ci d′		*!	*	
c. (q'a ci·) d′		*!		**
Word: (q'a·) (cín') ba				

↑

Contingent non-syllabification

- when the final C is in the Word onset, it is unsyllabified in the Stem
  - don't need a defective syllable to provide a stem-final onset position
  - also prevents coda processes from wrongly applying to such consonants (Rice 1990)
- eliminates need for general extrasyllabicity at the Stem level
  - instead, it is forced exactly when motivated by later onset position
  - otherwise, Stem coda directly blocks Foot Flipping
  - IDENT-L is still ranked higher in the Word level, but has no global effect

Stem: /q'a·-cid/	GLOBALSYL	PARSE	*(CV·)CV	IDENT-L
a. (q'a·) cid ←	*!			
b. (q'a·) ci d′		*	*!	
c. ☞ (q'a ci·) d′		*		**
Word: (q'a ci·) du				

Precompiled syllabification

- but Global Syllabification requires true look-ahead
- what if, instead, the Stem level generates two outputs that later compete
  - optional final extrasyllabic C, yielding (q'a:)(cin') and (q'aci:)d′
  - syllabification-focused version of the precompilation of Hayes (1990)
- at the Word level, the two inputs are treated as stem allomorphs
  - the choice follows from the existing constraint ranking
  - the stem is preferred that has a branching iambic foot as long as it does not require a change in vowel length by Closed-Syllable Shortening
    - such changes are already penalized in the Word level
- complicates the nature of optimal candidate selection at the Stem level
  - but the choices are quite restricted: final C is syllabified or not
    - perhaps more choices in a language that permits complex onsets
  - related to other types of optionality or variation?
- and contradicts claim that outward-looking allomorphy is not phonological

Stem allomorphy

- Italian verb stems (*andare* 'to go')
  - *vádo, vái, vá; andiámo, andáte, vánno*
  - phonological conditioning: *va(d)-* if stressed, otherwise *and-*
  - morphosyntactic conditioning: *and-* if 1st or 2nd person plural
- Bobaljik, Embick: morphosyntactic conditioning is a more restrictive account for attested allomorphy
  - phonological conditioning predicts unattested patterns
- does not appear possible to characterize the Kashaya alternation by reference to morphosyntactic features
  - 34 suffixes can occur as the first in the Word domain
  - evenly split between C and V initial
  - no apparent connection to morphosyntactic properties
  - e.g. evidentials *-do*, *-qa*, *-ya* vs. *-a*, *-inna*
- but others at this workshop argue that this claim may be too strong

Distributed morphology

- suppose suffixes are classified into two groups, Inner and Outer
  - no Inner suffix can be added once an Outer suffix occurs (Marantz 2007)
- after addition of the first Outer suffix, a cycle of phonological rules applies to the entire domain preceding the Outer suffix
  - corresponds to the Stem in the Stratal OT approach
  - matches the standard spell-out of a phase-head complement (Chomsky 2001, Kaye 1995)
- Outer suffix does not undergo these rules
  - therefore should itself not yet be spelled out
  - but prosodic shape of the first Outer suffix has to be available
  - whether a final C in the preceding Inner suffix can be syllabified into the next syllable
- suggests special role for prosodic structure of phase head during spell-out
  - more subtle interpretation of the relationship between vocabulary insertion and relative visibility of spelled-out content to phonological rules?

OT with Candidate Chains

- Eval compares CHAINS of candidates (McCarthy 2007)
  - serial representations but global evaluation
  - one step in the chain for every Faithfulness violation
  - each step must be harmonically improving
- handles opacity by PRECEDENCE constraints
  - PREC(A,B) where A and B are basic Faithfulness constraints
  - violation of constraint A has to precede violation of B in the chain
  - **and** violation of A cannot follow violation of B
- e.g., opaque interaction of vowel apocope and coda devoicing
  - /pad/ → [pat] but /pada/ → [pad]
  - need to choose chain < pada, pad > without devoicing
- PREC (IDENT-VOICE, MAX-V)
  - reject < pada, pad, pat >
  - because IDENT-VOICE cannot be violated after MAX-V

Optimal Interleaving

- original OT-CC has no account of stratal effects
  - except perhaps morpheme-specific rankings
  - or classes of morphemes, such as "Word-level"
- Stem vs. Word is a kind of opacity
  - viewed phonologically, lack of Lengthening etc. is unexpected
  - so analyze as a kind of opacity using Precedence
  - but have to involve the morphology in the PREC constraint in order to do this
- Optimal Interleaving
  - spell-out of morpheme as a step in the chain (Wolf 2008)
  - insertion counts as a Faithfulness violation
- PREC can then control ordering of spell-out
  - refer to a "Word-level" class of affixes since there are no strata

OI and Iambic Lengthening

- in Kashaya, prevent lengthening after spell-out of Word affix
  - mediated by Faithfulness violation, i.e. IDENT-L
  - PREC (IDENT-L, Insert-Aff_{ClassW})
- chain (a) wins because violation of IDENT-L (b8) cannot be preceded by spell-out of Word affix (b6)

a.
1 < mo-DIR_s-DUR_s-$EVID_w$,
2 momac-DUR_s-$EVID_w$,
3 momaced-$EVID_w$,
4 (moma)ced-$EVID_w$,
5 (moma·)ced-$EVID_w$,
6 (moma·)cedela,
7 (moma·)(cede)la >

b.
1 < mo-DIR_s-DUR_s-$EVID_w$,
2 momac-DUR_s-$EVID_w$,
3 momaced-$EVID_w$,
4 (moma)ced-$EVID_w$,
5 (moma·)ced-$EVID_w$,
6 (moma·)cedela,
7 (moma·)(cede)la,
8 *(moma·)(cede·)la >

OI and Foot Flipping

- if assume final extrasyllabic C, the ranking is familiar
  - Stratal: GLOBAL-SYL >> *(CV·)CV >> IDENT-L
  - Interleaving: PREC >> *(CV·)CV >> IDENT-L
- but requires a revised "split-PREC" theory
  - the two clauses are decoupled (Wolf 2011)
  - here PREC(A,B) is PREC (IDENT-L, Insert-Aff_{ClassW})
  - YES: violation of A cannot follow violation of B
  - NO: violation of Faith constraint A has to precede violation of B
- latter clause predicts gratuitous lengthening will occur
  - cf. a simple derivation like /ca-ba/ 'having sat'
  - lengthen to /ca·/ before adding /ba/
- such a revision leads to more kinds of opaque interactions
  - mutual and self- counterfeeding and counterbleeding

Basic observations about the data

- given a structure [[[Root]X]Y]
  - where X and Y belong to different phonological domains
- phonology of X makes partial reference to content of Y
- but that reference has to be partial
  - otherwise a Word suffix will undergo Stem processes
- Stratal OT approach can generalize over several processes that create long vowels in the Stem but not in the Word
  - Iambic Lengthening and Foot Flipping as well as Vowel Elision
  - by means of a single faithfulness constraint
- in other approaches, e.g. cophonologies, strata could be a relic of a previous stage in the diachrony of the language
  - require no synchronic formalization

Summary of approaches

- Lexical Phonology
  - easy Stem vs. Word
  - difficulty with cross-level interaction
    - temporary ill-formed anti-iamb
- Constraint domains
  - ad hoc Stem vs. Word
  - easy global interaction
  - difficulty with opacity
- Stratal OT with floating mora
  - easy Stem vs. Word
  - difficulty with cross-level interaction
    - unusual assumptions about status of mora

Summary of approaches

- Stratal OT with special syllabification
  - easy Stem vs. Word
  - correctly focuses on the issue of syllable structure, but
    - GLOBALSYL is true look-ahead, although limited
    - precompiled syllabification is unusual kind of allomorphy
- Distributed Morphology
  - difficulty in accessing outward phonology
  - effect on syllable structure, without full participation
- Optimal Interleaving
  - easy global effect
  - ad hoc reference to Word affixes
  - weakened assumptions about PREC

Yahwíy!

(Thank you.)

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