Lexical accents are underlying foot edges:

New evidence from ancient Indo-European

Anthony D. Yates
University of California, Los Angeles
adyates@ucla.edu

October 26, 2019
NELS 50
M.I.T.

What is a lexical accent?

- In languages with phonologically unpredictable stress systems, certain morphemes may preferentially attract word stress

What is a lexical accent?

- In languages with phonologically unpredictable stress systems, certain morphemes may preferentially attract word stress — e.g., Cupeño (Takic, Uto-Aztecan; Hill 2005):

a. [nə́-təw] ‘I saw’

↑

/nə-təw/

b. [nə-pə́w] ‘my friend’

↑

/nə-pə́w/

What is a lexical accent?

- In languages with phonologically unpredictable stress systems, certain morphemes may preferentially attract word stress — e.g., Cupeño (Takic, Uto-Aztecan; Hill 2005):

a.	[nə́-təw]	‘I saw’	b.	[nə-pə́w]	‘my friend’
	↑			↑	
	/nə-təw/			/nə-pə́w/	

- Stress-attracting morphemes — like /pə́w/ ‘friend’ in (b) — are lexically ACCENTED (Hill and Hill 1968, Alderete 2001b, Yates 2017a,b).

What is a lexical accent?

- In languages with phonologically unpredictable stress systems, certain morphemes may preferentially attract word stress — e.g., Cupeño (Takic, Uto-Aztecan; Hill 2005):

a.	[nə́-təw]	‘I saw’	b.	[nə-pə́w]	‘my friend’
	↑			↑	
	/nə-təw/			/nə-pə́w/	

- Stress-attracting morphemes — like /pə́w/ ‘friend’ in (b) — are lexically ACCENTED (Hill and Hill 1968, Alderete 2001b, Yates 2017a,b).
- Principal question addressed today:
  - **How is accentedness represented in the lexicon?**

What is a lexical accent?

- It is generally assumed that a lexical accent is a prosodic element affiliated with an accented morpheme.

What is a lexical accent?

- It is generally assumed that a lexical accent is a prosodic element affiliated with an accented morpheme.
- But there is disagreement with respect to whether it is:

What is a lexical accent?

- It is generally assumed that a lexical accent is a prosodic element affiliated with an accented morpheme.
- But there is disagreement with respect to whether it is:

  (i) An abstract prominence autosegmentally linked to an input vowel, which is thus preferentially incorporated into metrical structure (Revithiadou 1999, 2007, Alderete 2001a, *i.a.*).

What is a lexical accent?

- It is generally assumed that a lexical accent is a prosodic element affiliated with an accented morpheme.
- But there is disagreement with respect to whether it is:

  (i) An abstract prominence autosegmentally linked to an input vowel, which is thus preferentially incorporated into metrical structure (Revithiadou 1999, 2007, Alderete 2001a, *i.a.*).

  (ii) Metrical structure directly pre-specified in the input (Inkelas 1999, Özçelik 2014, *i.a.*).

Hypothesis (i) — lexical accent as autosegment

- A lexical accent is an underlying prominence (∗), autosegmentally linked to a vocalic peak:

a. UNACCENTED ROOT

/CVCV/

b. ACCENTED ROOT

/CV́CV/

∗

- Accented vowel preferentially receives primary stress by incorporation into head of word's head foot — e.g., assuming right-aligned trochees:

a. /CVCV-CV/ → $\omega(\text{CV}.\Sigma_{\text{HD}}(\text{CV́}.\text{CV}))$ *(default)*

∗

b. /CV́CV-CV/ → $\omega(\Sigma_{\text{HD}}(\text{CV́}.\text{CV}).\text{CV})$ *(non-default)*

∗ ∗

Hypothesis (ii) — lexical accent as metrical structure

- A lexical accent is a metrical head foot directly specified in the input:

a. UNACCENTED ROOT
/CVCV/

b. ACCENTED ROOT
/Σ_{HD}(CVCV)/

- Head foot is preferentially preserved in output and "accented vowel" stressed as the foot's head — e.g., assuming right-aligned trochees:

a. /CVCV-CV/ → ω(CV.Σ_{HD}(CV́.CV)) *(default)*

b. /Σ_{HD}(CVCV)-CV/ → ω(Σ_{HD}(CV́.CV).CV) *(non-default)*

Lexical accents are underlying foot edges

- **Claim**: Only underlying metrical structure can account for distribution of word stress in two ancient Indo-European (IE) languages:
  - Hittite (Anatolian)
  - Vedic Sanskrit (Indic)

Lexical accents are underlying foot edges

- **Claim**: Only underlying metrical structure can account for distribution of word stress in two ancient Indo-European (IE) languages:
  - Hittite (Anatolian)
  - Vedic Sanskrit (Indic)
- Crucial evidence comes from "secondary mobility" (Kiparsky 2010) — i.e., cases in which accented syllable peaks are eliminated in the output.

Lexical accents are underlying foot edges

- **Claim**: Only underlying metrical structure can account for distribution of word stress in two ancient Indo-European (IE) languages:
  - Hittite (Anatolian)
  - Vedic Sanskrit (Indic)
- Crucial evidence comes from "secondary mobility" (Kiparsky 2010) — i.e., cases in which accented syllable peaks are eliminated in the output.
- **Proposal:** Accented morphemes contain a foot edge in their lexical representation which is preserved in the output due to high-ranking faithfulness (ANCHOR; cf. Özçelik 2014, Yawney 2018).

Roadmap

§1 Introduction

§2 Word stress in Vedic and Hittite

- Core data
- Proposal & analysis

§3 “Secondary mobility” in Vedic and Hittite

§4 Analyzing Vedic “secondary mobility”

- ✓ Under the metrical representation
- ✗ Under the autosegmental representation

§5 Extending the analysis — “secondary mobility” in Hittite

- ✓ Under the metrical representation
- ✗ Under the autosegmental representation

§6 Discussion

General principles of stress assignment

- Both Hittite and Vedic have:
  - A lexical contrast between accented and unaccented morphemes.
  - A phonological preference for the single stress-bearing syllable to coincide with the word's left edge

General principles of stress assignment

- Both Hittite and Vedic have:
  - A lexical contrast between accented and unaccented morphemes.
  - A phonological preference for the single stress-bearing syllable to coincide with the word's left edge — i.e., Kiparsky and Halle's (1977) BASIC ACCENTUATION PRINCIPLE:

BASIC ACCENTUATION PRINCIPLE (BAP):
If a word has more than one accented vowel, word stress is assigned to the leftmost. If a word has no accented vowel, word stress is assigned to the leftmost syllable.

Core data

- Preference for left edge stress is clearly observed in Hittite and Vedic nominal and verbal inflection.

Core data

- Preference for left edge stress is clearly observed in Hittite and Vedic nominal and verbal inflection.
- Unaccented root + unaccented suffix ⇒ default leftmost stress:

a.	Hitt.	/pat-os/	→	[pá:t-os] *pātu*[š]	‘feet’ (foot-ANIM.ACC.PL)
b.	Ved.	/pad-am/	→	*pā́d-am*	‘foot’ (foot-M.ACC.SG)

Core data

- Preference for left edge stress is clearly observed in Hittite and Vedic nominal and verbal inflection.
- Unaccented root + unaccented suffix ⇒ default leftmost stress:

a. Hitt. /pat-os/ → [pá꞉t-os] ‘feet’ (foot-ANIM.ACC.PL)
pātu[*š*]

b. Ved. /pad-am/ → *pā́d-am* ‘foot’ (foot-M.ACC.SG)

- Unaccented root + accented suffix ⇒ suffix attracts stress:

c. Hitt. /pat-án/ → [pat-á꞉n] ‘of the feet’ (foot-ANIM.GEN.PL)
patān

d. Ved. /pad-á́/ → *pad-á́* ‘with the foot’ (foot-M.INSTR.SG)

Core data

- Multiple accented morphemes ⇒ leftmost wins

Core data

- Multiple accented morphemes ⇒ leftmost wins
  - Word-initial (e–f):

e. Hitt. /kénu-ás/ → [kéːnw-as] ‘of the knee’ (knee-N.GEN.SG)
gēnuwaš

f. Ved. /gáv-ā́/ → *gáv-ā* ‘with the cow’ (cow-ANIM.INSTR.SG)

Core data

- Multiple accented morphemes ⇒ leftmost wins
  - Word-initial (e–f):

e. Hitt. /kénu-ás/ → [kéːnw-as] ‘of the knee’ (knee-N.GEN.SG)
gēnuwaš

f. Ved. /gáv-ā́/ → *gáv-ā* ‘with the cow’ (cow-ANIM.INSTR.SG)

  - Word-internal (g–h):

g. Hitt. /ek^{w}-skːé-wéni/ → [ak^{w}ː-skːéː-wani] ‘we drink’ (drink-IPFV-1PL.NPST.NACT)
akkuškewani

h. Ved. /marút-sú/ → *marút-su* ‘among the Maruts’ (Marut-M.LOC.PL)

Analyzing core data

- Vedic (and Hittite) show default leftmost stress — e.g.:

  Ved. /pad-am/ → *(pā́.dam)* 'foot' (foot-M.ACC.SG)

- This pattern falls out from interaction of:

  (i) CULMINATIVITY: A prosodic word has exactly one stressed syllable.
  (ii) TROCHAIC: Feet have initial prominence.
  (iii) ALL-FEET-LEFT: Feet must be aligned with the left-edge of the prosodic word. Assign one violation (*) for each intervening syllable peak.

/pad-am/		Culm	Troch	All-Ft-L
a.	pā.dam	*!		
b.	(pā.dám)		*!	
c. ☞	(pā́.dam)			
d.	pā.(dám)			*!

Analyzing core data

- Accented morphemes attract stress in Vedic (and Hittite) — e.g.:

  Ved. /pad-á́/ → *pa.(dá́)* 'with the foot' (foot-M.INSTR.SG)

- **How is this stress-attracting property encoded in the lexicon?**

Proposal

- Two components of the proposal (cf. Özçelik 2014, Yawney 2018):
  - **Accented morphemes contain the left edge of a head foot in their lexical representation — e.g. (a) vs (b):**

a. UNACCENTED ACC.SG

Ved. /-am/

b. ACCENTED INSTR.SG

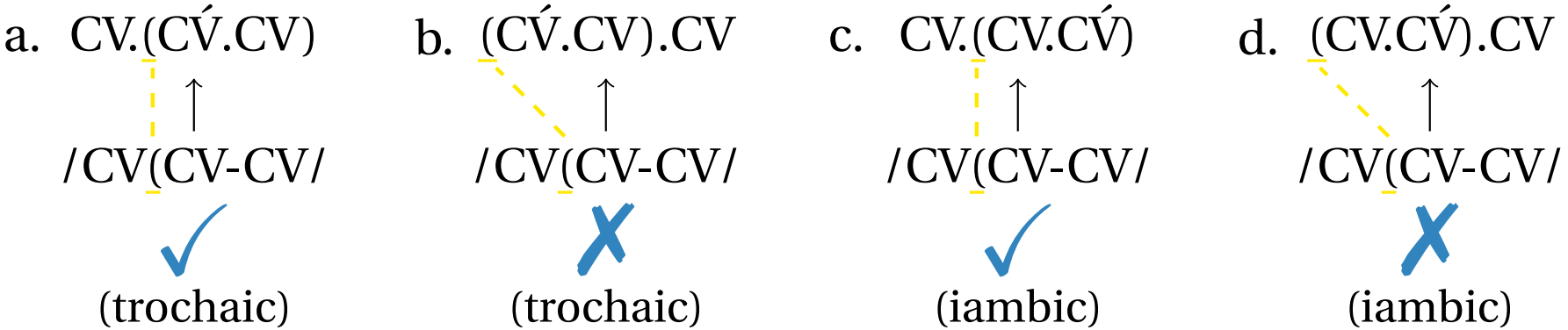
Ved. /-(ā/

Proposal

- Two components of the proposal (cf. Özçelik 2014, Yawney 2018):
  - **Underlying foot is preserved in output due to high-ranking faithfulness — i.e., (i):**

(iv) ANCHOR-L: The left edge of every head foot in the input corresponds to the left edge of a head foot in the output. Assign a violation (*) if a syllable peak intervenes.

- ANCHOR-L enforces faithfulness to location of left foot edge; foot shape/rhyme type are independently determined:



Proposal

- Two components of the proposal (cf. Özçelik 2014, Yawney 2018):
  - **Underlying foot is preserved in output due to high-ranking faithfulness — i.e., (i):**

(iv) ANCHOR-L: The left edge of every head foot in the input corresponds to the left edge of a head foot in the output. Assign a violation (*) if a syllable peak intervenes.

- ANCHOR-L is violated only if a syllable peak intervenes between left edge of input/output foot:

e. CV.CV.(CV́C)
/CVCVC-(VC/ ✓

f. CV.(CV́.CVC)
/CVCVC-(VC/ ✗

Analyzing core data

- Accented morphemes attract stress in Vedic (and Hittite) — e.g.:

  Ved. /pad-(ā/ → *pa.(dā́)* ‘with the foot’ (foot-M.INSTR.SG)

- This pattern emerges if ANCHOR-L dominates ALL-FEET-L.

/pad-*i*(ā/		Culm	Troch	Anchor-L	All-Ft-L
a.	☞ pa.*i*(dā́)				*
b.	*i*(pá.dā)			*!	
c.	*i*(pa.dā́)		*!	*	
d.	pa.dā	*!			

- (b–c) violate ANCHOR-L because a σ intervenes.

  ⇒ (a) wins by satisfying ANCHOR-L (i.e., no intervening σ).

Analyzing core data

- Leftmost wins in Vedic (and Hittite) — e.g.:

  Ved. /(gav-(ā/ → *(gá.vā)* ‘with the cow’ (cow-ANIM.INSTR.SG)

- This pattern generated by same ranking:

/*i*(gav-*j*(ā/		Culm	Troch	Anchor-L	All-Ft-L
a.	*i*(gá).*j*(vā́)	*!			*
b. ☞	*ij*(gá.vā)			*	
c.	ga.*ij*(vā́)			*	*!
d.	*ij*(ga.vā́)		*!	*	

- (b) and (c) each have one mis-anchored foot (violating ANCHOR-L).
  - ⇒ (b) is preferred because it better satisfies lower-ranked ALL-FEET-L.

“Secondary mobility” — data

- Both Hittite and Vedic exhibit stress alternations involving what Kiparsky (2010) terms “secondary mobility.”
  - Three distinct types are observed in Vedic.
  - One of these types is also found in Hittite (cf. Yates 2019).

“Secondary mobility” — type 1

- Both Hittite and Vedic also exhibit intraparadigmatic stress alternations (in IE literature, “hysterokinetic”) in which:
  - Final /a/ of polysyllabic stem is stressed in “strong” cases (NOM, ACC).
  - Stem-final /a/ is deleted and inflectional endings stressed in prevocalic “weak” cases.

		STRONG		WEAK	
a.	Hitt.	[pisé:n-os]	:	[pisn-á:s]	(man-NOM.PL/GEN.SG)
		pišēnuš		[*p*]*išnāš*	
b.	Hitt.	[χ^{w}ort:-á:i-n]	:	[χ^{w}ort:-j-á:s]	(swear-NML-ANIM.ACC.SG/GEN.SG)
		ḫurdāin		*ḫurtiyaš*	

“Secondary mobility” — type 1

- Both Hittite and Vedic also exhibit intraparadigmatic stress alternations (in IE literature, “hysterokinetic”) in which:
  - Final /a/ of polysyllabic stem stressed in “strong” cases (NOM, ACC.SG/DU).
  - Stem-final /a/ is deleted and inflectional endings stressed in prevocalic “weak” cases.

		STRONG		WEAK	
c.	Ved.	*ukṣáṇ-as*	:	*ukṣṇ-ás*	(ox-M.NOM.PL/GEN.SG)
d.	Ved.	*dā-tár-am*	:	*dā-tr-á*	(give-AGT-M.ACC.SG/INSTR.SG)

“Secondary mobility” in Vedic — type 1

- Analysis of Kiparsky (2010) — in “strong” cases, accented stem-final /á/ attracts stress before unaccented inflectional ending, e.g.:

a. Ved. /ukṣáṇ-as/ → *ukṣáṇ-as* ‘oxen’ (ox-M.NOM.PL)

b. Ved. /dā-tár-am/ → *dā-tā́r-am* ‘giver’ (give-AGT-M.ACC.SG)

“Secondary mobility” in Vedic — type 1

- Analysis of Kiparsky (2010) — in “strong” cases, accented stem-final /á/ attracts stress before unaccented inflectional ending, e.g.:

a. Ved. /ukṣáṇ-as/ → *ukṣáṇ-as* ‘oxen’ (ox-M.NOM.PL)

b. Ved. /dā-tár-am/ → *dā-tā́r-am* ‘giver’ (give-AGT-M.ACC.SG)

- In “weak” cases, accented inflectional ending conditions deletion of stem-final /á/ (“Zero-Grade rule”) and attracts stress:

c. Ved. /ukṣáṇ-ás/ → *ukṣṇ-ás* ‘of the ox’ (ox-M.GEN.SG)

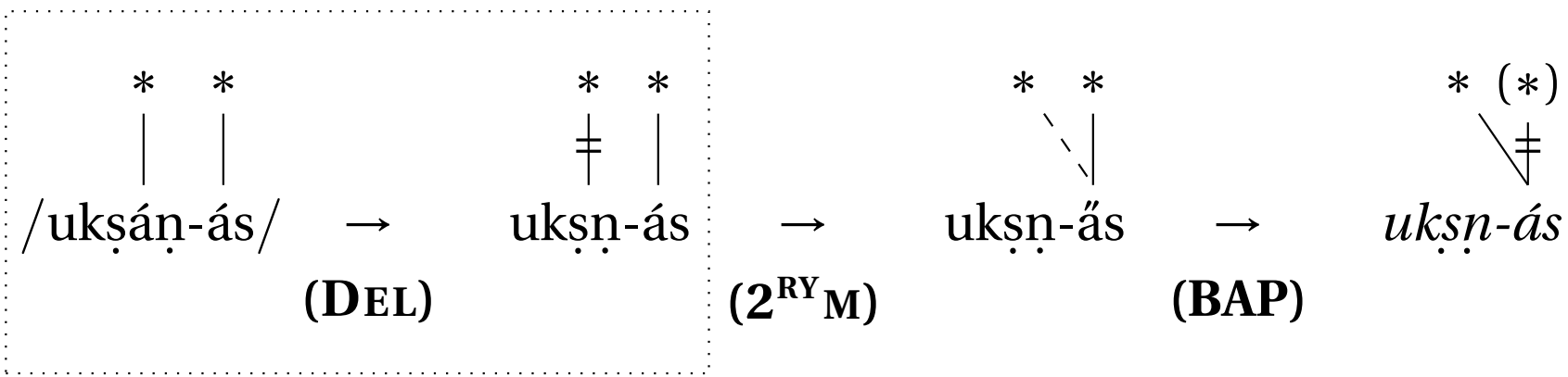
d. Ved. /dā-tár-é/ → *dā-tr-é* ‘giver’ (give-AGT-M.ACC.SG)

“Secondary mobility” in Vedic — type 1

- Per Kiparsky (2010) deletion of accented vowels triggers:

  > SECONDARY MOBILITY (2^{RY}M): “When a syllable is eliminated, its accent shifts to the next syllable.”

- Assuming an autosegmental representation of accentedness (with Kiparsky 2010), this would yield a stepwise derivation like:



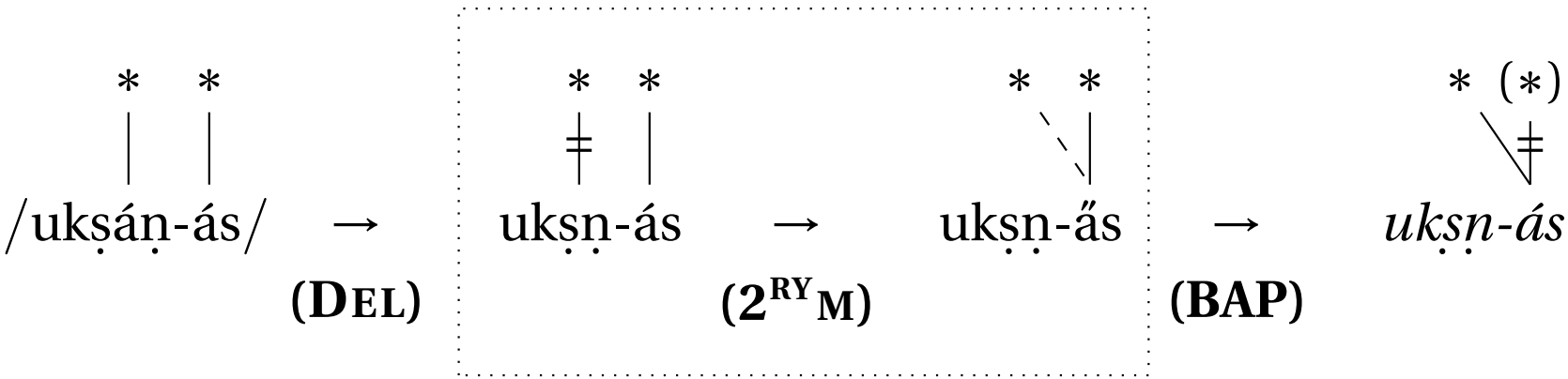
STEP 1: Accented ending induces deletion of stem-final /á/.

“Secondary mobility” in Vedic — type 1

- Per Kiparsky (2010) deletion of accented vowels triggers:

  > SECONDARY MOBILITY (2^{RY}M): “When a syllable is eliminated, its accent shifts to the next syllable.”

- Assuming an autosegmental representation of accentedness (with Kiparsky 2010), this would yield a stepwise derivation like:



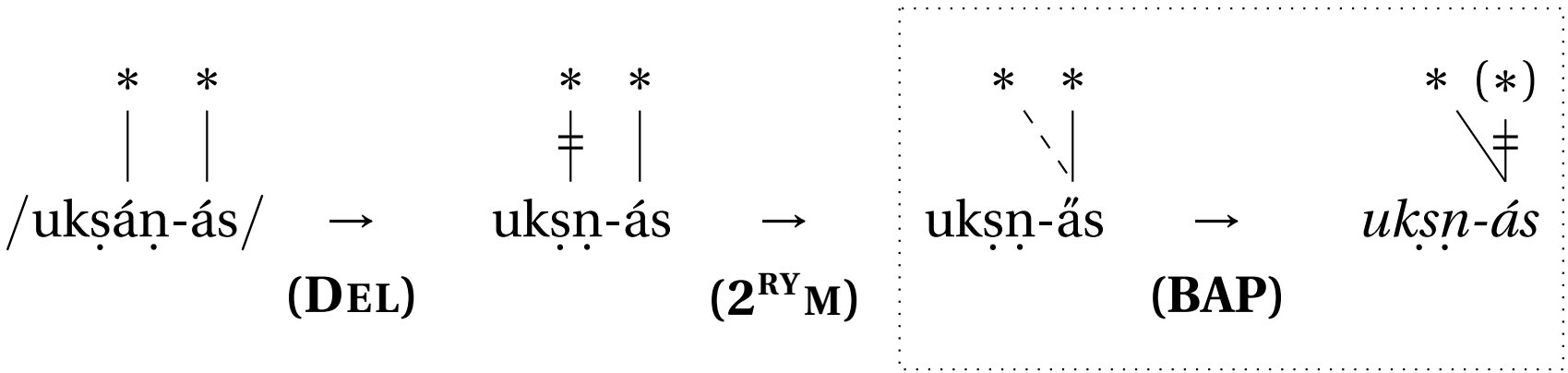
STEP 2: Floating suffixal accent reassociates rightward via 2^{RY}M.

“Secondary mobility” in Vedic — type 1

- Per Kiparsky (2010) deletion of accented vowels triggers:

  SECONDARY MOBILITY (2^{RY}M): “When a syllable is eliminated, its accent shifts to the next syllable.”

- Assuming an autosegmental representation of accentedness (with Kiparsky 2010), this would yield a stepwise derivation like:



STEP 3: One accent deleted and other assigned stress via BAP.

“Secondary mobility” in Vedic — type 2

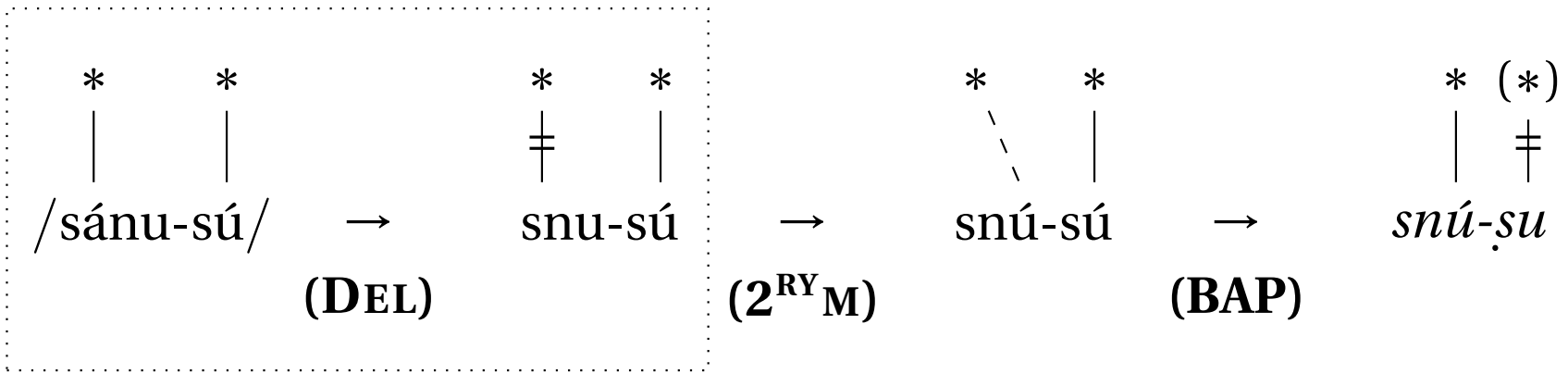
- In a second type of “secondary mobility” in Vedic:
  - The accented first /á/-vowel of a disyllabic stem is deleted.
  - Stress surfaces on the unaccented vowel to its right in preference to the accented ending.

Ved. /sánu-sú/ → *snúṣu* ‘on (their) backs’ (back-N.LOC.PL) (cf. NOM.SG *sā́nu*)

“Secondary mobility” in Vedic — type 2

- In a second type of “secondary mobility” in Vedic:
  - The accented first /á/-vowel of a disyllabic stem is deleted.
  - Stress surfaces on the unaccented vowel to its right in preference to the accented ending.

Ved. /sánu-sú/ → *snúṣu* ‘on (their) backs’ (back-N.LOC.PL) (cf. NOM.SG *sā́nu*)

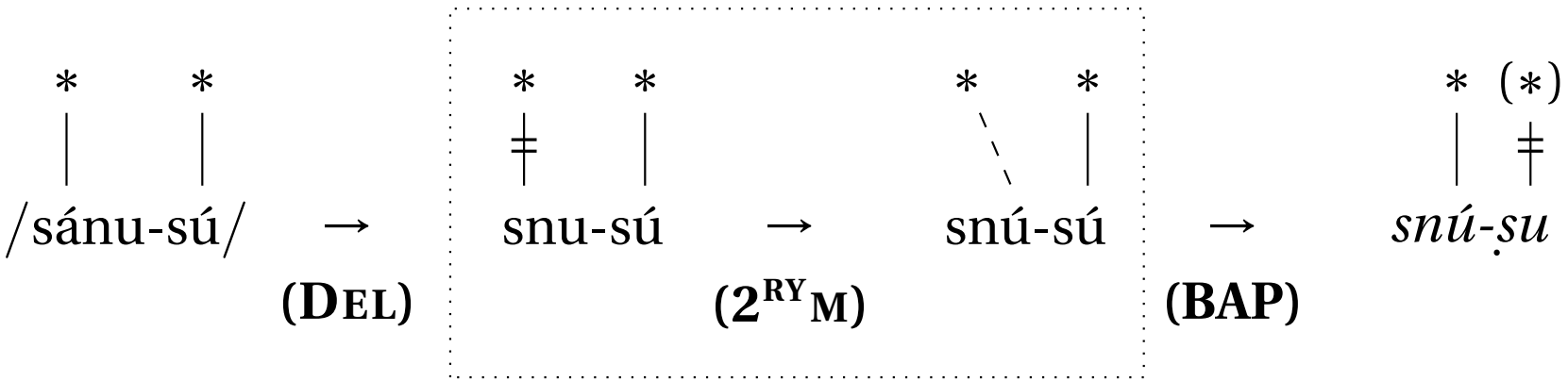


STEP 1: Accented ending induces deletion of stem /á/-vowel .

“Secondary mobility” in Vedic — type 2

- In a second type of “secondary mobility” in Vedic:
  - The accented first /á/-vowel of a disyllabic stem is deleted.
  - Stress surfaces on the unaccented vowel to its right in preference to the accented ending.

Ved. /sánu-sú/ → *snúṣu* ‘on (their) backs’ (back-N.LOC.PL) (cf. NOM.SG *sā́nu*)

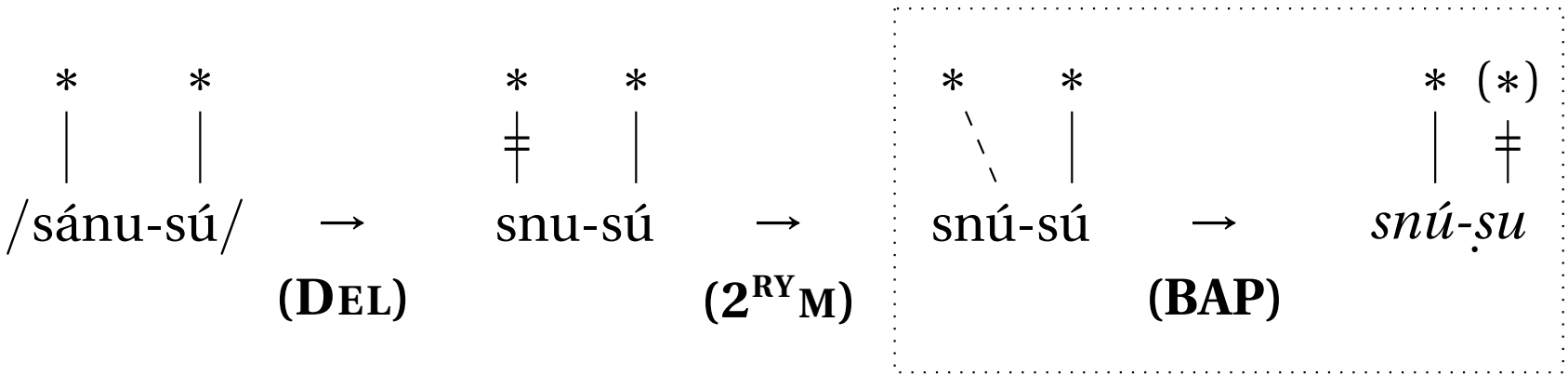


STEP 2: Floating suffixal accent reassociates rightward via 2RYM.

“Secondary mobility” in Vedic — type 2

- In a second type of “secondary mobility” in Vedic:
  - The accented first /á/-vowel of a disyllabic stem is deleted.
  - Stress surfaces on the unaccented vowel to its right in preference to the accented ending.

Ved. /sánu-sú/ → *snúṣu* ‘on (their) backs’ (back-N.LOC.PL) (cf. NOM.SG *sā́nu*)



STEP 3: Leftmost accent assigned stress and other deleted via BAP.

“Secondary mobility” in Vedic — type 3

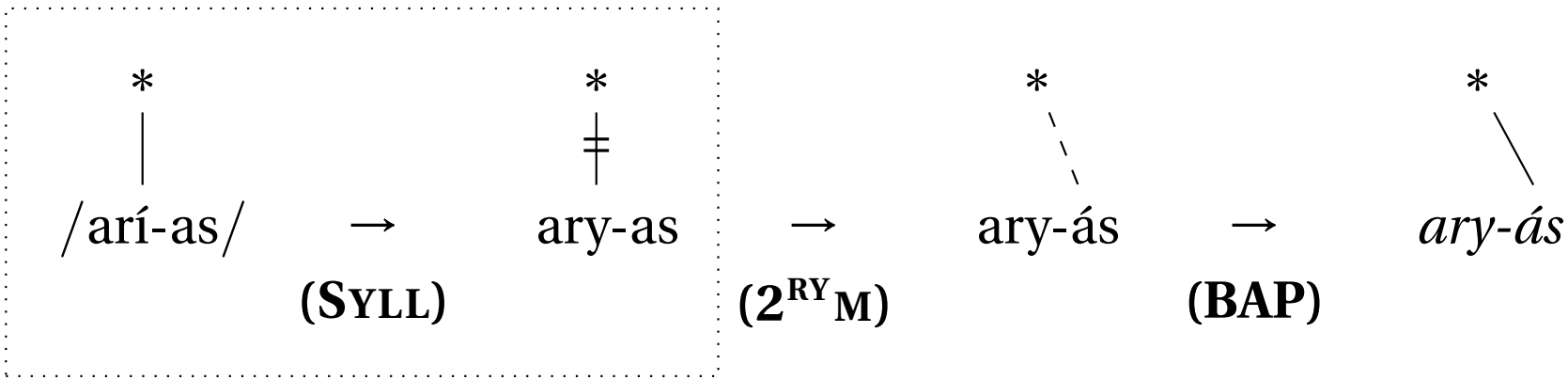
- In a third type of “secondary mobility” in Vedic:
  - An accented syllable peak is eliminated by resyllabification as a glide.
  - Stress surfaces on an unaccented morpheme to its right.

Ved. /arí-as/ → *aryás* ‘friends’ (friend-M.NOM.PL) (cf. NOM.SG *arí-s*)

“Secondary mobility” in Vedic — type 3

- In a third type of “secondary mobility” in Vedic:
  - An accented syllable peak is eliminated by resyllabification as a glide.
  - Stress surfaces on an unaccented morpheme to its right.

Ved. /arí-as/ → *aryás* ‘friends’ (friend-M.NOM.PL) (cf. NOM.SG *arí-s*)

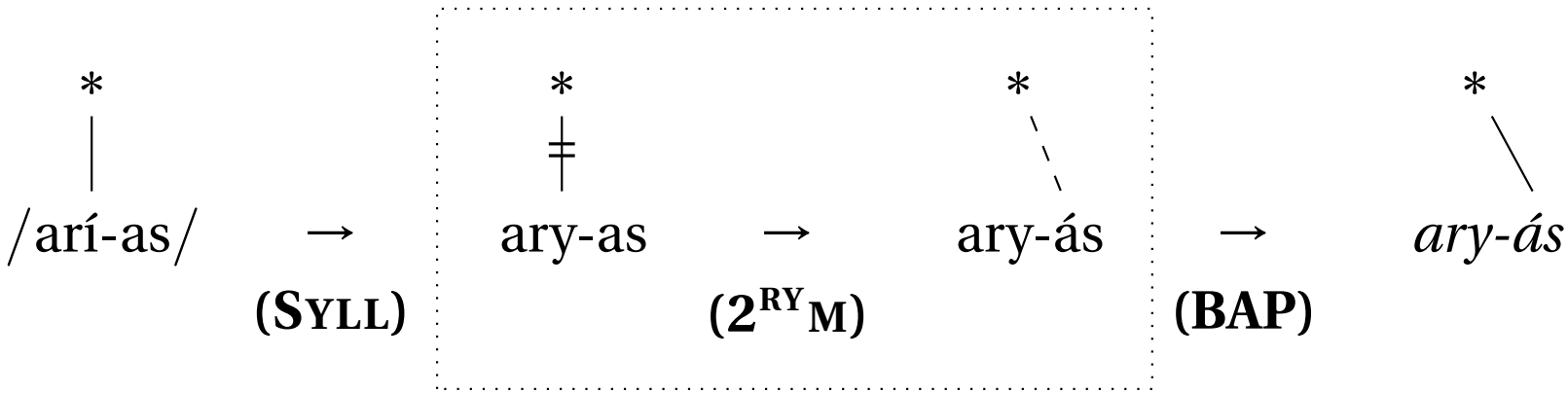


STEP 1: Accented σ eliminated by resyllabification (/i/ → [j]).

“Secondary mobility” in Vedic — type 3

- In a third type of “secondary mobility” in Vedic:
  - An accented syllable peak is eliminated by resyllabification as a glide.
  - Stress surfaces on an unaccented morpheme to its right.

Ved. /arí-as/ → *aryás* ‘friends’ (friend-M.NOM.PL) (cf. NOM.SG *arí-s*)

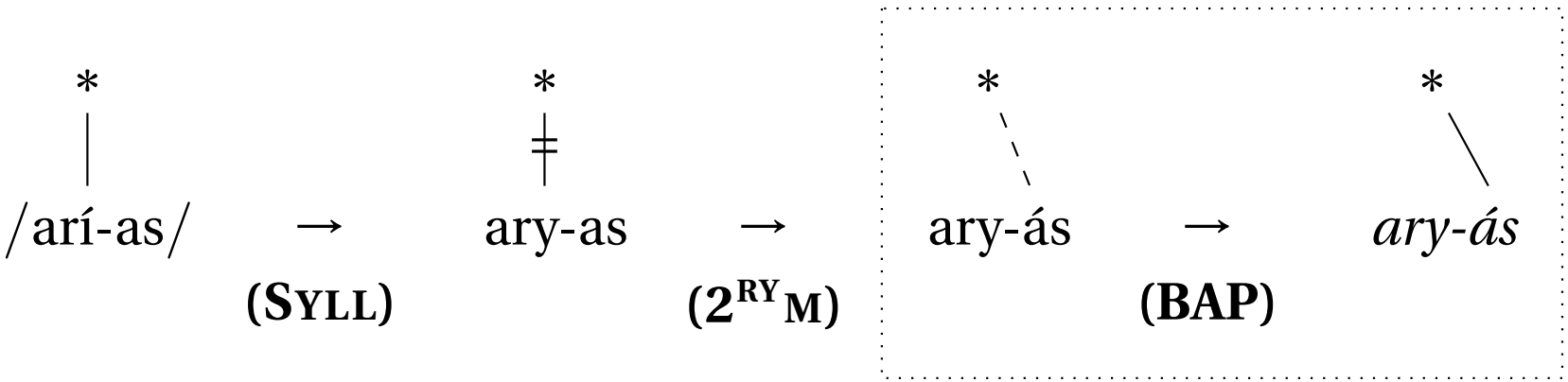


STEP 2: Floating suffixal accent reassociates rightward via 2^{RY}M.

“Secondary mobility” in Vedic — type 3

- In a third type of “secondary mobility” in Vedic:
  - An accented syllable peak is eliminated by resyllabification as a glide.
  - Stress surfaces on an unaccented morpheme to its right.

Ved. /arí-as/ → *aryás* ‘friends’ (friend-M.NOM.PL) (cf. NOM.SG *arí-s*)



STEP 3: Reassociated accent is assigned stress via BAP.

Implications of “secondary mobility”

- Two claims advanced below w.r.t. SECONDARY MOBILITY:

Implications of “secondary mobility”

- Two claims advanced below w.r.t. SECONDARY MOBILITY:

(i) Can be captured under metrical representation of accentedness.

  - 2^{RY}M emerges from same ranking that accounts for core data.

Implications of “secondary mobility”

- Two claims advanced below w.r.t. SECONDARY MOBILITY:

(i) Can be captured under metrical representation of accentedness.

- 2^{RY}M emerges from same ranking that accounts for core data.

(ii) Cannot be captured under autosegmental representation of accentedness

Implications of "secondary mobility"

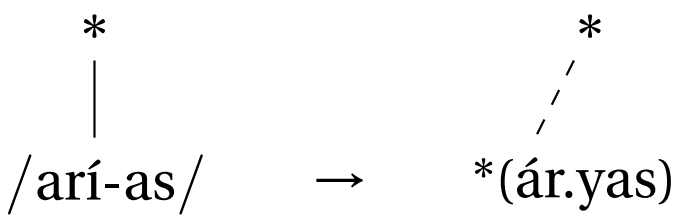
- Two claims advanced below w.r.t. SECONDARY MOBILITY:

(i) Can be captured under metrical representation of accentedness.

- $2^{RY}M$ emerges from same ranking that accounts for core data.

(ii) Cannot be captured under autosegmental representation of accentedness — it incorrectly predicts:

- In type 3 — leftward migration of delinked accents in order to better satisfy preference for left edge stress (rather than rightward under Kiparsky's (2010) SECONDARY MOBILITY).



Implications of "secondary mobility"

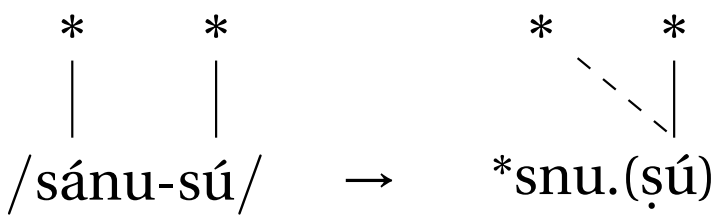
- Two claims advanced below w.r.t. SECONDARY MOBILITY:

(i) Can be captured under metrical representation of accentedness.

- $2^{RY}M$ emerges from same ranking that accounts for core data.

(ii) Cannot be captured under autosegmental representation of accentedness — it incorrectly predicts:

- In type 2 — "long-distance" migration of delinked accents (rather than 1σ under Kiparsky's (2010) SECONDARY MOBILITY).



Analyzing “secondary mobility” — type 2

- Deletion of accented stem-initial /á/ by accented ending triggers “secondary mobility:”

  Ved. /(sanu-(su/ → *(snú.ṣu)* ‘on (their) backs’ (back-N.LOC.PL)

/*i*(sanu-*j*(su/		CULM	ANCH-L	ALL-FT-L	MAX-V
a.	*i*(snú).*j*(ṣú)	*!		*	*
b. ☞	*ij*(snú.ṣu)		*		*
c.	snu.*ij*(ṣú)		*	*!	*

- Candidate (a) (faithful modulo deletion) is ruled out by CULMINATITY.
- (b) and (c) each have one mis-anchored foot (violating ANCHOR-L).

  ⇒ ALL-FT-L selects (b) as winner, which satisfies ANCHOR-L w.r.t. underlying foot at word’s left edge.

Analyzing “secondary mobility” — type 1

- Deletion of accented stem-final /á/ by accented ending triggers “secondary mobility:”

  Ved. /uk(ṣaṇ-(as/ → *uk.(ṣṇás)* ‘of the ox’ (OX-M.GEN.SG)

/uk$_i$(ṣaṇ-$_j$(as/	CULM	ANCH-L	ALL-FT-L	MAX-V
a. $_i$(úk).$_j$(ṣṇás)	∗!	∗	∗∗∗	∗
b. ☞ uk.$_{ij}$(ṣṇás)			∗	∗
c. $_{ij}$(úk.ṣṇas)		∗!∗		∗

- (c) with left edge stress is ruled out by its (double) violation of ANCHOR-L.

  ⇒ (b) wins by satisfying ANCHOR-L.

Analyzing “secondary mobility” — type 1

- Deletion of accented stem-final /á/ by accented ending triggers “secondary mobility:”

  Ved. /uk(ṣaṇ-(as/ → *uk.(ṣṇás)* ‘of the ox’ (OX-M.GEN.SG)

/uk$_i$(ṣaṇ-$_j$(as/	CULM	ANCH-L	ALL-FT-L	MAX-V
a. $_i$(úk).$_j$(ṣṇás)	*!	*	***	*
b. ☞ uk.$_{ij}$(ṣṇás)			*	*
c. $_{ij}$(úk.ṣṇas)		*!*		*
d. uk.$_{ij}$(ṣá.ṇas)		*!	*	

- ★ Deletion in (b) is prosodically optimizing — it allows two underlying feet to stand in perfect correspondence with single output foot.

  ⇒ (b) is preferred to a hypothetical candidate (d) with non-deletion and stem-final stress, which violates ANCHOR-L.

Analyzing “secondary mobility” — type 3

- Resyllabification of accented high *V* triggers “secondary mobility:”

  Ved. /ar(i-as/ → *ar.(yás)* ‘friends’ (friend-M.NOM.PL)

- Resyllabification driven by constraint against hiatus:

  (v) *VV: Adjacent vowels are not permitted.

/ar*i*(i-as/			*VV	*CULM	ANCHOR-L	ALL-FT-L
a.		a.*i*(rí.as)	*!			*
b.	☞	ar.*i*(yás)				*
c.		*i*(ár.yas)			*!	

- (b) satisfies ANCHOR-L by resyllabifying *V́* into onset of head foot.
- Whereas loser (c) (with “leftward reassociation”) violates it.

Vedic stress assignment — interim summary

- Under a metrical representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✓ All types of Vedic “secondary mobility” adduced by Kiparsky (2010).

Vedic stress assignment — interim summary

- Under a metrical representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✓ All types of Vedic "secondary mobility" adduced by Kiparsky (2010).
- Now — analytic comparison:

Vedic stress assignment — interim summary

- Under a metrical representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✓ All types of Vedic "secondary mobility" adduced by Kiparsky (2010).
- Now — analytic comparison:
  - **Can this data be accounted for under an autosegmental representation of lexical accentedness?**

Analytic comparison — an autosegmental analysis

- Analyses that adopt an autosegmental representation of accentedness (Revithiadou 1999, 2007, Alderete 2001a, *i.a.*) standardly enforce faithfulness with constraints like:

  (i) MAX-PROM: "A prominence in the input (= accent) must have a correspondent in the output (= stress)."

  (ii) DEP-PROM: "A prominence in the output (= stress) must have a correspondent in the input (= accent)."

- Consider the derivation in (a):

a. /pad-á/ → *pa.(dá)*

✓ no violations

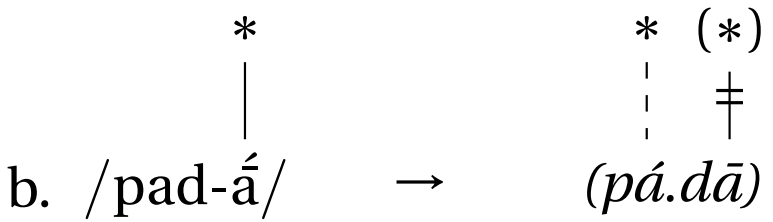
Analytic comparison — an autosegmental analysis

- Analyses that adopt an autosegmental representation of accentedness (Revithiadou 1999, 2007, Alderete 2001a, *i.a.*) standardly enforce faithfulness with constraints like:

  (i) MAX-PROM: "A prominence in the input (= accent) must have a correspondent in the output (= stress)."

  (ii) DEP-PROM: "A prominence in the output (= stress) must have a correspondent in the input (= accent)."

- Consider the derivation in (b):



✗ violates MAX-PROM, DEP-PROM

Analytic comparison — an autosegmental analysis

- Analyses that adopt an autosegmental representation of accentedness (Revithiadou 1999, 2007, Alderete 2001a, *i.a.*) standardly enforce faithfulness with constraints like:

(iii) *FLOP-PROM: "Let χ_i be an input prominence, ζ_j be a vocalic peak, S_k phonological representations

$S_1 \mathscr{R} S_2$,
χ_1 and $\zeta_1 \in S_1$, χ_2 and $\zeta_2 \in S_2$,
$\chi_1 \mathscr{R} \chi_2$ and $\zeta_1 \mathscr{R} \zeta_2$,
if χ_1 is associated with ζ_1, then χ_2 is associated with ζ_2"

- Consider the derivation in (c):

c. /pad-á/ → *(pá.dā)*

✗ violates *FLOP-PROM.

Analytic comparison — an autosegmental analysis

- These constraints suffice to capture core data — just substitute *FLOP-PROM ≫ MAX-PROM for ANCHOR-L in constraint ranking established in metrical analysis.

METRICAL: CULM ≫ ANCHOR-L ≫ ALL-FEET-L

↕

AUTOSEGMENTAL: CULM, { *FLOP-PROM ≫ MAX-PROM } ≫ ALL-FEET-L

Analytic comparison — an autosegmental analysis

- These constraints suffice to capture core data — just substitute *FLOP-PROM ≫ MAX-PROM for ANCHOR-L in constraint ranking established in metrical analysis — e.g., preserve underlying accents:

/pad-á/	*FLOP-PROM	MAX-PROM	ALL-FT-L
a. ☞ pa.(dá)			*
b. (pá.dā)		*!	
c. (pá.dā)	*!		

“Secondary mobility” under an autosegmental analysis

- But this ranking fails to capture “secondary mobility” when accented high *V́* is resyllabified (= type 3).

/arí-as/	*VV	*FLOP	MAX	ALL-FT-L
a. a.(rí.as)	*!			*
b. (ár.yas)				
c. ar.(yás)				*!
d. (ár.yas)			*!	

(By definition) *FLOP is irrelevant when input *V́* lacks corresponding *V* in output.

“Secondary mobility” under an autosegmental analysis

- But this ranking fails to capture “secondary mobility” when accented high *V́* is resyllabified (= type 3).

/arí-as/	*VV	*FLOP	MAX	ALL-FT-L
a. a.(rí.as)	*!			*
b. (ár.yas)				
c. ar.(yás)				*!
d. (ár.yas)			*!	

← Freed to migrate, the accent is predicted to shift **leftward** as in (b).

“Secondary mobility” under an autosegmental analysis

- But this ranking fails to capture “secondary mobility” when accented high *V́* is resyllabified (= type 3).

/arí-as/	*VV	*FLOP	MAX	ALL-FT-L
a. a.(rí.as)	*!			*
b. (ár.yas)				
c. ar.(yás)				*!
d. (ár.yas)			*!	

← But the attested form is (c) with **rightward** reassociation.

“Secondary mobility” under an autosegmental analysis

- This ranking also fails to capture “secondary mobility” when first *V́* of a disyllabic stem is deleted (= type 2).

/sánu-sú/	CULM	*FLOP	MAX	ALL-FT-L
a. (snú).(ṣú)	*!			*
b. ☹ (snú.ṣu)		*!		
c. ☹ (snú.ṣu)			*!	
d. 💣 snu.(ṣú)				*

Left edge stress requires a linked accent to be delinked and reassociated or deleted (violating *FLOP-PROM in (b), MAX-PROM in (c) respectively).

“Secondary mobility” under an autosegmental analysis

- This ranking also fails to capture “secondary mobility” when first *V́* of a disyllabic stem is deleted (= type 2).

/sánu-sú/	CULM	*FLOP	MAX	ALL-FT-L
a. (snú).(ṣú)	*!			*
b. ☹ (snú.ṣu)		*!		
c. ☹ (snú.ṣu)			*!	
d. 💣 snu.(ṣú)				*

← Accent freed by deletion is predicted to migrate to position of the linked accent as in (d).

“Secondary mobility” under an autosegmental analysis

- This ranking also fails to capture “secondary mobility” when first *V́* of a disyllabic stem is deleted (= type 2).

/sánu-sú/	CULM	*FLOP	MAX	ALL-FT-L
a. (snú).(ṣú)	*!			*
b. ☹ (snú.ṣu)		*!		
c. ☹ (snú.ṣu)			*!	
d. 💣 snu.(ṣú)				*

But attested form is (b)/(c) with local (i.e., one *σ*) rightward migration.

Vedic stress assignment — summary

- Under a metrical representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✓ All types of Vedic “secondary mobility” adduced by Kiparsky (2010).
- Under an autosegmental representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✗ All types of Vedic “secondary mobility” adduced by Kiparsky (2010).

Vedic stress assignment — summary

- Under a metrical representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✓ All types of Vedic "secondary mobility" adduced by Kiparsky (2010).
- Under an autosegmental representation of lexical accentedness, it is possible to account for:
  - ✓ Stress assignment in Vedic Sanskrit inflection in general.
  - ✗ All types of Vedic "secondary mobility" adduced by Kiparsky (2010).
- Further support for the metrical representation comes from Hittite.

Stress assignment in Hittite

- Like Vedic, Hittite prefers left edge stress in inflection (cf. §2 above).
- But accented derivational morphemes regularly override this preference ("dominant"; Kiparsky and Halle 1977 *et seq.*), attracting stress in preference to accented stems to their left (Yates 2017b) — e.g.:

a.	Hitt.	/manijáχː-ái-s/	→	[manijaχː-áːi-s]	'administration district'
				[*man*]*iyaḫḫāiš*	(administer-NML-ANIM.NOM.SG)
b.	Hitt.	/sáru-ái-t/	→	[saːrw-áːi-t]	'plundered'
				šarwāit	(plunder-VBL-3SG.PST.ACT)
c.	Hitt.	/χatúka-átar-∅/	→	[χatuːk-áːtar]	'terror'
				ḫatugātar	(terrible-NML-N.NOM/ACC.SG)

- Pattern in (a–c) is a case of HEAD FAITHFULNESS (Revithiadou 1999).
  - ⇒ Accentual properties of a morphological head are privileged over those of non-heads.

“Secondary mobility” in Hittite complex derivation

- Such complex stems show “secondary mobility” at their right edge in the same way as simplex stems — e.g., complex (a) vs. simplex (b):

a.	Hitt.	/manijáχː-ái-ás/	→	[manijaχː-j-áːs]	‘of administration district’
				maniyaḫḫiyaš	(administer-NML-ANIM.GEN.SG)
b.	Hitt.	/pisén-ás/	→	[pisn-áːs]	‘of the man’
				[*p*]*išnāš*	(man-ANIM.GEN.SG)

- In each case, deletion of stem-final *V́* by accented inflectional ending allows the ending to attract stress in preference to this *V́*.

“Secondary mobility” in Hittite complex derivation

- Such complex stems show “secondary mobility” at their right edge in the same way as simplex stems — e.g., complex (a) vs. simplex (b):

a.	Hitt.	/manijáχː-ái-ás/	→	[manijaχː-j-áːs]	‘of administration district’
				maniyaḫḫiyaš	(administer-NML-ANIM.GEN.SG)
b.	Hitt.	/pisén-ás/	→	[pisn-áːs]	‘of the man’
				[*p*]*išnāš*	(man-ANIM.GEN.SG)

- In each case, deletion of stem-final *V́* by accented inflectional ending allows the ending to attract stress in preference to this *V́*.
- “Secondary mobility” in such complex stems can be accounted for under a metrical analysis.

“Secondary mobility” in Hittite complex derivation

- Accented derivational suffixes (= heads) preferentially attract stress due to higher-ranked ANCHOR-L_{HD}:

  (vi) ANCHOR-L_{HD}: The left edge of every head foot in the input associated with a morphological head corresponds to the left edge of a head foot in the output. Assign a violation (*) if a syllable peak intervenes.

	mani$_i$(jaχː-$_j$(ai-s	CULM	ANCH-L_{HD}	ANCH-L	ALL-FT-L
a.	ma.ni.$_i$(jáχ).$_j$(χáːis)	*!			*****
b.	ma.ni.$_{ij}$(jáχ).χais		*!	*	**
c. ☞	ma.ni.jaχ.$_{ij}$(χáːis)			*	***
d.	$_{ij}$(máː.ni).jaχ.χais		*!	**	

- (b) preserves leftmost foot rather than foot associated with morphological head (in violation of top-ranked ANCHOR-L_{HD}).

  ⇒ (c) wins by preserving foot associated with morphological head.

“Secondary mobility” in Hittite complex derivation

- “Secondary mobility” falls out from the same ranking:

mani$_i$(jaχː-$_j$(ai-$_k$(as		CULM	ANCH-L$_{HD}$	ANCH-L	ALL-FT-L
a.	ma.ni.$_i$(jáχ).$_j$(χá:).$_k$(já:s)	*!			*********
b.	ma.ni.$_{ijk}$(yáχ.χjas)		*!	**	**
c. ☞	ma.ni.jaχ.$_{ijk}$(χjá:s)			*	***
d.	ma.ni.jaχ.$_{ijk}$(χá:.jas)			**!	***

“Secondary mobility” in Hittite complex derivation

- “Secondary mobility” falls out from the same ranking:

mani$_i$(jaχː-$_j$(ai-$_k$(as		CULM	ANCH-L$_{HD}$	ANCH-L	ALL-FT-L
a.	ma.ni.$_i$(jáχ).$_j$(χáː).$_k$(jáːs)	*!			*********
b.	ma.ni.$_{ijk}$(yáχ.χjas)		*!	**	**
c. ☞	ma.ni.jaχ.$_{ijk}$(χjáːs)			*	***
d.	ma.ni.jaχ.$_{ijk}$(χáː.jas)			**!	***

- (b) is eliminated by violation of top-ranked ANCHOR-L$_{HD}$.

“Secondary mobility” in Hittite complex derivation

- “Secondary mobility” falls out from the same ranking:

	mani$_i$(jaχː-$_j$(ai-$_k$(as	CULM	ANCH-L$_{HD}$	ANCH-L	ALL-FT-L
a.	ma.ni.$_i$(jáχ).$_j$(χáː).$_k$(jáːs)	*!			*********
b.	ma.ni.$_{ijk}$(yáχ.χjas)		*!	**	**
c. ☞	ma.ni.jaχ.$_{ijk}$(χjáːs)			*	***
d.	ma.ni.jaχ.$_{ijk}$(χáː.jas)			**!	***

- (b) is eliminated by violation of top-ranked ANCHOR-L$_{HD}$.
- (c) and (d) — a viable candidate in Hittite due to differing conditions on stem-final vowel deletion (Yates 2019) — satisfy ANCHOR-L$_{HD}$.

“Secondary mobility” in Hittite complex derivation

- “Secondary mobility” falls out from the same ranking:

	mani$_i$(jaχː-$_j$(ai-$_k$(as	CULM	ANCH-L$_{HD}$	ANCH-L	ALL-FT-L
a.	ma.ni.$_i$(jáχ).$_j$(χáː).$_k$(jáːs)	*!			*********
b.	ma.ni.$_{ijk}$(yáχ.χjas)		*!	**	**
c. ☞	ma.ni.jaχ.$_{ijk}$(χjáːs)			*	***
d.	ma.ni.jaχ.$_{ijk}$(χáː.jas)			**!	***

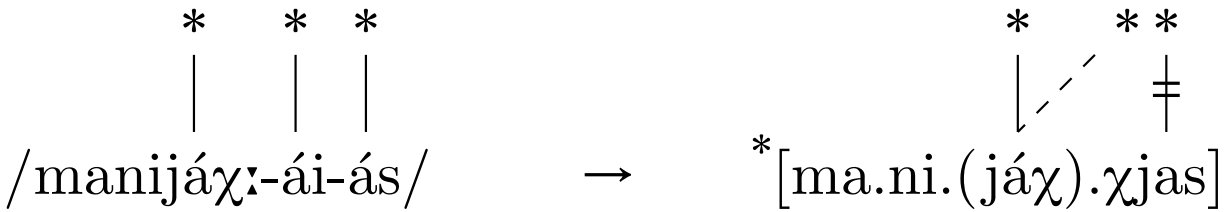
- (b) is eliminated by violation of top-ranked ANCHOR-L$_{HD}$.
- (c) and (d) — a viable candidate in Hittite due to differing conditions on stem-final vowel deletion (Yates 2019) — satisfy ANCHOR-L$_{HD}$.
- But (c) wins because it **also** satisfies ANCHOR-L w.r.t. underlying foot associated with inflectional ending.
  - ⋆ Crucially, *V́*-deletion allows two underlying feet to stand in perfect correspondence with a single output foot.

“Secondary mobility” in Hittite complex derivation

- “Secondary mobility” falls out from the same ranking:

	mani$_i$(jaχː-$_j$(ai-$_k$(as	CULM	ANCH-L$_{HD}$	ANCH-L	ALL-FT-L
a.	ma.ni.$_i$(jáχ).$_j$(χáː).$_k$(jáːs)	*!			*********
b.	ma.ni.$_{ijk}$(yáχ.χjas)		*!	**	**
c. ☞	ma.ni.jaχ.$_{ijk}$(χjáːs)			*	***
d.	ma.ni.jaχ.$_{ijk}$(χáː.jas)			**!	***

- But the same derivation fails under the autosegmental representation, which incorrectly predicts “leftward” reassociation of derivational suffix’s accent — i.e., an output like (b) above:



Discussion

- Analyses employing metrical or autosegmental representations of lexical accentedness make predictions that are broadly similar.
- But these predictions differ when an accented vocalic peak lacks an output correspondent (due to vowel deletion, glide formation, etc.).
- **In this special case, Vedic Sanskrit and Hittite support the metrical representation**, providing a principled explanation for:
  - ✓ Rightward "reassociation" of lexical accents de-linked by deletion/resyllabification in a left edge-oriented system.
  - ✓ Local "reassociation" of such de-linked accents.

Discussion

- Analyses employing metrical or autosegmental representations of lexical accentedness make predictions that are broadly similar.
- But these predictions differ when an accented vocalic peak lacks an output correspondent (due to vowel deletion, glide formation, etc.).
- **In this special case, Vedic Sanskrit and Hittite support the metrical representation**, providing a principled explanation for:
  - ✓ Rightward "reassociation" of lexical accents de-linked by deletion/resyllabification in a left edge-oriented system.
  - ✓ Local "reassociation" of such de-linked accents.
- Future work:
  - Extending proposal to "pre-accenting" morphemes (attested in Vedic) and "post-accenting" morphemes.
  - Further empirical testing.

Thank you!

- Special thanks to the members of the:
  - Indo-European & Modern Linguistic Theory research group
  - UCLA Phonology Seminar
  - UCLA Indo-European Studies Graduate Seminar
  - UCLA American Indian Linguistics Seminar
- As well as to Craig Melchert, Brent Vine, Stephanie Jamison, and Pam Munro.

References I

Alderete, John D. 2001a. *Morphologically Governed Accent in Optimality Theory*. New York: Routledge.

———. 2001b. Root-Controlled Accent in Cupeño. *Natural Language & Linguistic Theory* 19(3).455–502.

Hill, Jane H. 2005. *A Grammar of Cupeño*. Los Angeles / Berkeley, CA: University of California Press.

Hill, Jane H., and Kenneth C. Hill. 1968. Stress in the Cupan (Uto-Aztecan) Languages. *International Journal of American Linguistics* 34(4).233–241.

Inkelas, Sharon. 1999. Exceptional Stress-Attractic Suffixes in Turkish: Representation vs. the Grammar. In René Kager, Harry van der Hulst and Wim Zonneveld (eds.), *The Prosody-Morphology Interface*, 134–187. Cambridge / New York: Cambridge University Press.

References II

Kiparsky, Paul. 2010. Compositional vs. Paradigmatic Approaches to Accent and Ablaut. In Stephanie W. Jamison, H. Craig Melchert and Brent Vine (eds.), *Proceedings of the 21st Annual UCLA Indo-European Conference, Los Angeles, October 30-31, 2009*, 137–181. Bremen: Hempen.

Kiparsky, Paul, and Morris Halle. 1977. Towards a Reconstruction of the Indo-European Accent. In Larry Hyman (ed.), *Studies in Stress and Accent*, 209–238. Los Angeles: University of Southern California Press.

Özçelik, Öner. 2014. Prosodic faithfulness to foot edges: The case of Turkish stress. *Phonology* 31.229–269.

Revithiadou, Anthi. 1999. Headmost Accent Wins: Head Dominance and Ideal Prosodic Form in Lexical Accent Systems. Ph.D. diss., Leiden University.

———. 2007. Colored turbid accents and containment: A case study from lexical stress. In Sylvia Blaho, Patrik Bye and Martin Krämer (eds.), *Freedom of Analysis?*, 149–174. Berlin / New York: de Gruyter.

References III

Yates, Anthony D. 2017a. Against Root Faithfulness in Cupeño Stress. In Karen Jesney, Charlie O'Hara and Caitlin Smith (eds.), *Supplemental Proceedings of the 2016 Annual Meeting on Phonology*, 1–11.

———. 2017b. Lexical Accent in Cupeño, Hittite, and Indo-European. Ph.D. diss., University of California, Los Angeles.

———. 2019. Hittite *paḫḫweni*, Greek πυρί, and their implications for Indo-European ablaut. Paper presented at the 38th Annual East Coast Indo-European Conference, Philadelphia, 20–22 June 2019 (Handout available at: `http://www.adyates.com/research/`.

Yawney, Heather L. 2018. On the right to be faithful: The irregular stress of Turkish adverbials with *–En*. *Toronto Working Papers in Linguistics* 40.1–16.

On “pre-” and “post-accenting” morphemes

- The metrical analysis can also be extended straightforwardly to:

  (i) “Post-accenting” morphemes, which (in a trochaic language) have a lexical left foot edge at their right edge, as in (a).

a. /CV(-CVCV/ → CV.(CV́.CV) *(post-accenting prefix)*

- Accounting for “post-accenting” under this approach does not require positing empty vocalic positions (cf. Revithiadou 2007).

On “pre-” and “post-accenting” morphemes

- The metrical analysis can also be extended straightforwardly to:

  (i) “Post-accenting” morphemes, which (in a trochaic language) have a lexical left foot edge at their right edge, as in (a).
  (ii) “Pre-accenting” morphemes, which contain a right foot edge, as in (b).

a.	/CV(-CVCV/	→	CV.(CV́.CV)	*(post-accenting prefix)*
b.	/CVCV-CV)/	→	CV.(CV́.CV)	*(pre-accenting suffix)*

- Using a single (left) foot edge to represent foot head allows for representation of foot “tail” with the opposite (= right) edge, with both preserved in output by high-ranking faithfulness (ANCHOR-L/R).