

# Unexpected length: Prosodic vs. morphological structure

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September 19th, 2019

'Segmental Processes in Interaction with Prosodic Structure'

Tromsø

*Slides: <http://www.evazimmermann.org/talks.html>*

## Main Claim

- 🌀 there is a mapping between morphological and prosodic structure on tiers lower than the prosodic foot
- 🌀 there are constraints favouring **morpheme-contiguous dominance relations between moras and segments**
- 🌀 this constraint family correctly predict segmental asymmetries:
  - ① coexisting long vowels and vowel hiati across morpheme boundaries
  - ② the existence of long epenthetic vowels
  - ③ solves a RotB problem for morphological lengthening accounts
  - ④ the correlation between short epenthesis and exceptions to morphological lengthening

1. Introduction
2. Theoretical proposal
3. No heteromorphemic mora dominance
  - 3.1 Coexisting long vowels and vowel hiatus
4. No heteromorphemic mora dominance only
  - 4.1 Long epenthetic vowels
  - 4.2 A RotB problem
  - 4.3 Correlating epenthesis and exceptions
5. Conclusion

## A segmental asymmetry: Long vowels and hiati in Japanese

- 👉 a contrast between underlyingly long vowels and adjacent identical vowels across a morpheme boundary  
(Vance, 1987, 2008; Labrune, 2012; Lunden, 2018)

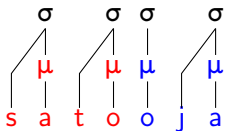
- (1) Japanese (Labrune, 2012, 45+46)
- |    |         |                 |                       |
|----|---------|-----------------|-----------------------|
| a. | sato:ja | <i>satou-ya</i> | 'sugar shop'          |
|    | satooja | <i>sato-oya</i> | 'foster parent'       |
| b. | su:ri   | <i>su:-ri</i>   | 'mathematical theory' |
|    | suwuri  | <i>su-uri</i>   | 'vinegar seller'      |

'a phonetic difference between the two members of each pair may appear in slow or formal speech, that is, it is possible to have a hiatus, materialized in the form of a pause of a light glottal stop [ʔ], between the first and second element of a double vowel' (Labrune, 2012, 45)

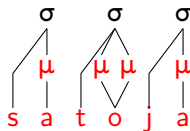
## Segmental asymmetry=Prosodic structure difference

## (2) Japanese

a.



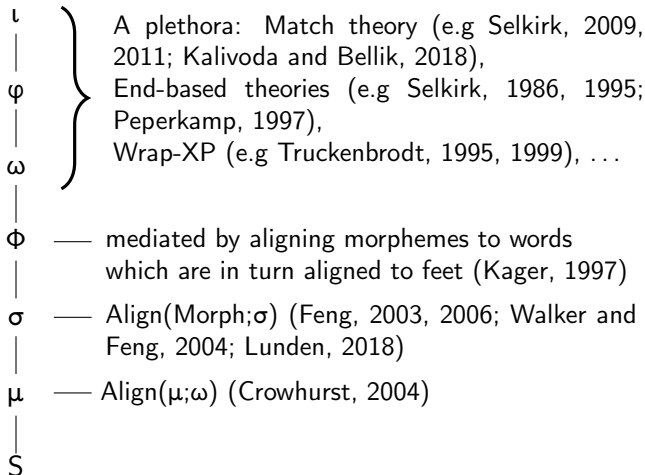
b.



- a Derived Environment Effect (=Grandfather Effect)  
(McCarthy, 2003; van Oostendorp, 2003; Farris-Trimble, 2008)  
A certain marked structure is only possible if newly created
- prosodic structure wants to mirror morphological structure

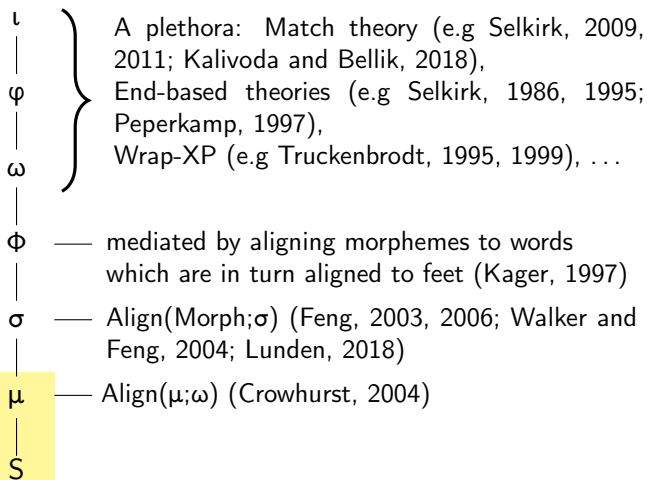
## Directly relating morpho-syntactic and prosodic structure

(3)



## Directly relating morpho-syntactic and prosodic structure

(3)



## Japanese: Aligning morphological and prosodic structure

- (4) Align(Morpheme, L;  $\sigma$ , L) (Lunden, 2018, 4)  
 The left edge of every morpheme must align to the left edge of a syllable.

- (5) Heteromorphemic hiatus

|            |       |     |      |
|------------|-------|-----|------|
|            | Align | *VV | Unif |
| <p>a. </p> |       | *   |      |
| <p>b. </p> | *!    |     | *    |

- (6) Homomorphemic long vowel

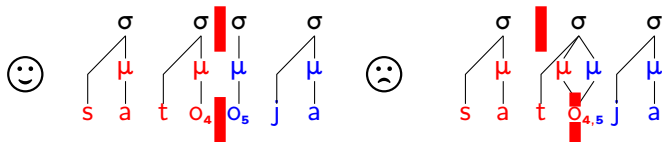
|            |       |     |      |
|------------|-------|-----|------|
|            | Align | *VV | Unif |
| <p>a. </p> |       | *!  |      |
| <p>b. </p> |       |     | *    |



## Aligning morphological and prosodic structure

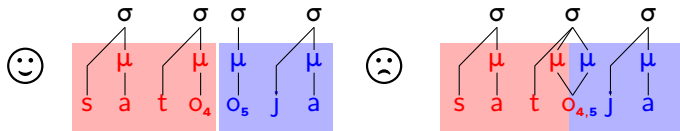
- Align(Morpheme,L; $\sigma$ ,L) indirectly predicts different  $\mu$ -integrations: It aligns segmental morphemes with syllables

## (7) Aligning segmental and syllable structure



- My proposal: Constraints penalizing **heteromorphemic  $\mu$ -segment-integration**

## (8) Demanding morpheme-contiguous mora dominance



## The proposal

### Two constraints relating morpho-syntactic and moraic structure

(9) NoHeteromorphicMoraForASegment ( $=*V^{\mu}$ )

Assign a violation mark for every V that is dominated by a  $\mu$  affiliated with a morpheme  $k$  if V is not affiliated with  $k$ .

(10) NotOnlyHeteromorphicMorasForASegment ( $=*V^{\mu}_{\text{only}}$ )

Assign a violation mark for every V that is only dominated by a  $\mu$  affiliated with a morpheme  $k$  if V is not affiliated with  $k$ .

### Predictions

- ① coexisting long vowels and vowel hiatus across morpheme boundaries
- ② the existence of long epenthetic vowels
- ③ solves a RotB problem for morphological lengthening accounts
- ④ the correlation between short epenthesis and exceptions to morphological lengthening

## Background assumption: Morphological colours

- the affiliation for every phonological element to a morpheme is visible for the phonology
- modeled as the assumption of **morphological colours** (van Oostendorp, 2006; Revithiadou, 2007; Trommer and Zimmermann, 2014)
- epenthetic elements are 'colourless'; they don't have an affiliation

### Phonology's access to Morphology

- an element has a morphological colour or not (=epenthetic)
- two elements have the same or a different morphological colour
- crucially different from morpheme-specific constraints where the phonology has access to the concrete nature of the morpheme (e.g. Ito and Mester, 1990; Golston and Wiese, 1996; Flack, 2007; Pater, 2010)

## The two constraints and their effect for moraic structure

- (11) NoHeteromorphicMoraForASegment ( $=*V^{\mu}$ )  
 Assign a violation mark for every  $V$  that is dominated by a  $\mu$  affiliated with a morpheme  $k$  if  $V$  is not affiliated with  $k$ .
- (12) NotOnlyHeteromorphicMorasForASegment ( $=*V^{\mu}_{\text{only}}$ )  
 Assign a violation mark for every  $V$  that is only dominated by a  $\mu$  affiliated with a morpheme  $k$  if  $V$  is not affiliated with  $k$ .

(\*In principle, the constraints are not specific to vowels. The (11)-counterpart for consonants simply does not make any predictions that \*Gem does not make.)

\*V<sup>μ</sup> and \*V<sup>μ</sup><sub>only</sub>: Toy example

(13)

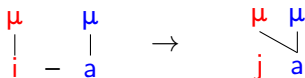
|    | $\mu$ - $\mu$<br>V            | *V <sup>μ</sup> | *V <sup>μ</sup> <sub>only</sub> | Dep-μ |
|----|-------------------------------|-----------------|---------------------------------|-------|
| a. | $\mu$ $\mu$<br> <br>V         |                 |                                 |       |
| b. | $\mu$ $\mu$<br>\ /<br>V       | *               |                                 |       |
| c. | $\mu$ $\mu$<br> <br>V         | *               | *                               |       |
| d. | $\mu$ $\mu$ $\mu$<br> <br>V   |                 |                                 | *     |
| e. | $\mu$ $\mu$ $\mu$<br>\ /<br>V | *               |                                 | *     |

*homomorphic μ**homo-&heteromorphic μ**heteromorphic μ**epenthetic μ**epenthetic&heteromorphic μ*

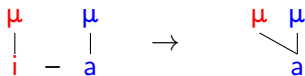
Heteromorphic  $\mu$ -association possible/expected

(14) Compensatory lengthening

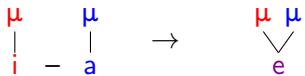
a. Gliding



b. Deletion

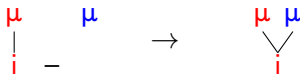


c. Coalescence

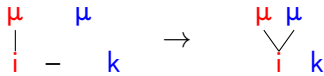


(15) Morphological lengthening

a. Only exponent



b. With segmental exponent



\*V<sup>μ</sup> and the problems can solve

- (16) NoHeteromorphicMoraForASegment (= \*V<sup>μ</sup>)  
 Assign a violation mark for every V that is dominated by a μ  
 affiliated with a morpheme <sub>k</sub> if V is not affiliated with <sub>k</sub>.
- ★ Absence of CL/ML  
 (Which of course also follows from \*V:, Ident-Length, ...)
  - ① coexisting long vowels and vowel hiatus across morpheme boundaries

Japanese and \*V<sup>μ</sup>

(17) Heteromorphemic hiatus

|            |                 |     |      |
|------------|-----------------|-----|------|
|            | *V <sup>μ</sup> | *VV | Unif |
| <p>a. </p> |                 | *   |      |
| <p>b. </p> | *!*             |     | *    |

(18) Homomorphemic long V

|            |                 |     |      |
|------------|-----------------|-----|------|
|            | *V <sup>μ</sup> | *VV | Unif |
| <p>a. </p> |                 | *!  |      |
| <p>b. </p> |                 |     | *    |



## And in case there is morphological lengthening in Japanese?

- there surely is in Shizuoka Japanese (Davis and Ueda, 2005)  
(emphatic adjective formation: *sup:ai* → *su:p:ai* 'sour')
- \*Float- $\mu$  makes heteromorphemic mora domination unavoidable

### (19) Morphological (heteromorphemic) lengthening

|    |  |               |             |              |      |
|----|--|---------------|-------------|--------------|------|
|    | $\mu$ - $\mu$ $\mu$ $\mu$ $\mu$<br>s u p a i | *Float- $\mu$ | * $\vee\mu$ | * $\vee\vee$ | Unif |
| a. | $\mu$ $\mu$ $\mu$ $\mu$ $\mu$<br>s u p a i   | * $\cdot$     |             |              |      |
| b. | $\mu$ $\mu$ $\mu$ $\mu$ $\mu$<br>s u p a i   |               | *           | *            |      |

(Simplified  $\mu$ -position: infix after the first stem- $\mu$  (Zimmermann and Trommer, 2013))

## \*V<sup>μ</sup><sub>only</sub> and the problems can solve

- (20) NotOnlyHeteromorphemicMorasForASegment (= \*V<sup>μ</sup><sub>only</sub>)  
 Assign a violation mark for every V that is only dominated by a μ affiliated with a morpheme <sub>k</sub> if V is not affiliated with <sub>k</sub>.
- ② predicts long epenthetic vowels
  - ③ solves a RotB problem for morphological lengthening accounts
  - ④ predicts the correlation between short epenthesis and exceptions to morphological lengthening

## Southern Sierra Miwok (=SSM)

(Yokuts-Utian; Freeland, 1951; Broadbent, 1964; Sloan, 1991)

🌀 vowel epenthesis\* to avoid complex onsets or codas (21-a)

🌀 vowel epenthesis to avoid superheavy syllables (21-b):

light: CV, CVC#

heavy: CVC, CV:, CV:C#

- (21) Phonological vowel epenthesis (Broadbent, 1964, 20)
- |    |              |                      |                       |
|----|--------------|----------------------|-----------------------|
| a. | hika(:)h-j   | hikah <i>ɨ</i> j     | 'deer' (Acc)          |
| b. | he:l-ma:     | he:l <i>ɨ</i> ma:    | 'I am fighting'       |
|    | hoŋ:oj-ksu-: | hoŋ:oj <i>o</i> ksu: | 'his bare knees show' |

(\*o/o\_, u/u\_, ɨ elsewhere)

## SSM: Morphological lengthening

- (22) Affixes trigger vowel lengthening (Broadbent, 1964, 82)
- |               |             |                    |    |
|---------------|-------------|--------------------|----|
| lit-h-a-:me?  | litha:me?   | 'it's risen on us' | 63 |
| kel:a-na-:me? | kel:ana:me? | 'It snowed on us'  | 63 |
| wile:p-a-:me? | wile:pa:me? | 'it flashed no us' | 63 |
- (23) 3.Ps.Sg: Morphological lengthening (Broadbent, 1964, 82)
- |              |           |                        |    |
|--------------|-----------|------------------------|----|
| wi:n-si-na-: | wi:nsina: | 'he just now came'     | 84 |
| ?am:u-k-a-:  | ?am:uka:  | 'he got hurt just now' | 82 |
| te:p-a-:     | te:pa:    | 'he cut it'            | 48 |
| jo:h-k-a-:   | jo:huka:  | 'he got killed'        | 82 |

## SSM: Morphological lengthening and long epenthesis

- if a predictable epenthetic vowel precedes a lengthening morpheme, a **long epenthetic vowel** surfaces

|      |                 |             |                                |
|------|-----------------|-------------|--------------------------------|
| (24) | Long epenthesis |             | (Broadbent, 1964; Sloan, 1991) |
| a.   | ha:ja-ŋk-:      | ha:jaŋkɪ:   | 'it is daylight' B82           |
| b.   | ʔumu:c-:meʔ     | ʔumu:cɪ:meʔ | 'it's raining on us' B63       |
|      | ʔopa:-t-:meʔ    | ʔopa:tɪ:meʔ | 'it's clouding up on us' B63   |

# Huallaga Quechua

(Quechuan Weber, 1947, 1996; Adelaar, 1984; Adelaar and Muysken, 2004)

👉 no long vowels in closed syllables and no consonant clusters

|      |                   |                         |                             |
|------|-------------------|-------------------------|-----------------------------|
| (25) | Insertion of /ni/ |                         | (Weber, 1947, 465)          |
|      | maqa—ma—q—ntsi:   | maqamaq <b>ni</b> ntsi: | 'the one who hit us (incl)' |
|      | ñatin—jnaq        | ñatin <b>:i</b> jnaq    | 'not having a liver'        |
|      | papa:—n           | papa: <b>ni</b> n       | 'his father'                |

👉 What is /ni/?

- a vacuous default morpheme (Cerrón-Palomino, 2008, 87)
- a 'connective element' (Adelaar, 1984, 36)

## Long epenthesis in Huallaga Quechua

(26) First person: Morphological lengthening (Weber, 1996; Adelaar, 1984)

|         |        |                    |           |         |
|---------|--------|--------------------|-----------|---------|
| wata    | 'tie'  | wata: <b>a</b> :   | 'I tie'   | A189    |
| wata-ra | 'tied' | watara: <b>a</b> : | 'I tied'  | A219    |
| ajwa    | 'walk' | ajwa: <b>a</b> :   | 'I walk'  | W96:246 |
| ka      | 'be'   | ka: <b>a</b> :     | 'I am'    | W96:246 |
| waska   | 'rope' | waska: <b>a</b> :  | 'my rope' | A189    |
| uma     | 'head' | uma: <b>a</b> :    | 'my head' | W96:97  |

(27) First person: Long /ni/ to avoid superheavy syllable (Weber, 1996)

|       |               |                     |                      |         |
|-------|---------------|---------------------|----------------------|---------|
| majur | '(the) older' | majurni: <b>i</b> : | 'my older (brother)' | W96:97  |
| hatun | 'big'         | hatun: <b>i</b> :   | 'my big one'         | W47:465 |

Guajiro (Arawakan; Goulet and Jusayú, 1978; Adelaar and Muysken, 2004; Álvarez, 2005; Álvarez and Dorado, 2005)

- (28) Infinitive: Morphological lengthening (Álvarez, 2005)
- |            |             |                        |
|------------|-------------|------------------------|
| kaʔwaju:se | kaʔwaju:se: | 'have spouse'          |
| kapɨfi     | kapɨfi:     | 'have maternal family' |
| aʃakata    | aʃakata:    | 'descend'              |
- (29) Infinitive: Long /wa/ to avoid superheavy syllable (Álvarez, 2005)
- |         |            |                 |
|---------|------------|-----------------|
| kamane: | kamane:wa: | 'be kind'       |
| japii   | japiiwa:   | 'be shy'        |
| katʃon  | katʃonwa:  | 'have children' |

☞ independent evidence for epenthetic nature of /w/: inserted to avoid adjacent long vowels (Vaux, 2002, 12)



## Long epenthetic vowels as a surprise

- 🌀 an epenthetic fixed value is always 'unmarked' (de Lacy, 2006)
- 🌀 they are phonetically (e.g. Davidson and Stone, 2003; Gick and Wilson, 2006; Gouskova and Hall, 2009) and psycholinguistically (e.g. van Donselaar et al., 1999) weak
- 🌀 they are defective and **lack a mora** (Piggott, 1995)
- ➔ but they can be long to **avoid heteromorphemic dominance only**

## Morphological vowel lengthening in SSM: Constraints

- (30)
- a. \*Float- $\mu$   
Assign a violation mark for every mora that is not associated to a segment.
  - b. \*V:  
Assign a violation mark for every vowel associated to two moras.
  - c.  $*(\mu\mu\mu)_\sigma$   
Assign a violation mark for every syllable associated to three moras.

## Morphological vowel lengthening in SSM

(31)

|    | l | i     | t     | h | a     | m     | e     | ? | *Float- $\mu$ | * $(\mu\mu)\sigma$ | *V <sub>i</sub> | Dep- $\mu$ |
|----|---|-------|-------|---|-------|-------|-------|---|---------------|--------------------|-----------------|------------|
|    |   | $\mu$ |       |   | $\mu$ | $\mu$ | $\mu$ |   |               |                    |                 |            |
| a. |   | $\mu$ | $\mu$ |   | $\mu$ | $\mu$ | $\mu$ |   | * $\cdot$     |                    |                 | *          |
| b. |   | $\mu$ | $\mu$ |   | $\mu$ | $\mu$ | $\mu$ |   |               |                    | *               | *          |

## Long epenthetic vowels as a surprise: SSM

(32)

|    |  | *Float- $\mu$ | * $(\mu\mu\mu)\sigma$ | *V: | Dep- $\mu$ |
|----|--|---------------|-----------------------|-----|------------|
| a. |  |               | *!                    | *   |            |
| b. |  |               |                       | *   |            |
| c. |  |               |                       | **! | *!         |

Long epenthetic vowels predicted from  $*V^\mu$  only: SSM

(33)

|    | $*V^\mu$ only | *Float- $\mu$ | * $(\mu\mu)_\sigma$ | *V; | Dep- $\mu$ |
|----|---------------|---------------|---------------------|-----|------------|
|    |               |               |                     |     |            |
| a. |               |               | * $\cdot$           | *   |            |
| b. | * $\cdot$     |               |                     | *   |            |
| c. |               |               |                     | **  | *          |

the additional epenthetic  $\mu$  (33-c) ensures that the mora dominance relation is not exclusively heteromorphic

A notorious problem for floating  $\mu$  accounts

- 🌀  $\mu$ 's on short vowels are non-contrastive/not necessarily underlying
- ➔  $\mu$ -less vowels are expected to be short despite morphological lengthening

(34)

|    |  | *Float- $\mu$ | *V:       | Dep- $\mu$ |
|----|--|---------------|-----------|------------|
| a. |  | * $\cdot$     |           | **         |
| b. |  |               |           | *          |
| c. |  |               | * $\cdot$ | ** $\cdot$ |

## Solutions to the RotB problem

- 🌀 mora projection applies before floating mora association; an instance of counterbleeding (e.g. Kiparsky, 1973; Bakovic, 2011)
- 🌀 Stratal OT (e.g. Kiparsky, 2000; Bermúdez-Otero, in preparation; Trommer, 2011) with optimization prior to concatenation
- 🌀 there is no problem since all predictable non-alternating structure is lexically stored (e.g. Inkelas, 1995; Bermúdez-Otero, 1999)
- ➔ underlyingly  $\mu$ -less vowels project an epenthetic  $\mu$  in addition to a morphological lengthening one to **avoid heteromorphemic dominance only**

Solving the RotB problem with  $*V^{\mu}$  only: SSM

(35)

|    |  | *Float- $\mu$ | * $V^{\mu}$ only | *V; | Dep- $\mu$ |
|----|--|---------------|------------------|-----|------------|
|    |  |               |                  |     |            |
| a. |  | *.!           |                  |     | **         |
| b. |  |               | *.!              |     | *          |
| c. |  |               |                  | *   | **         |

- ☞ the additional epenthetic  $\mu$  (35-c) ensures that the mora dominance relation is not exclusively heteromorphemic



But what about a low-ranked  $*V^{\mu}_{\text{only}}$  in SSM'?

(36)

|    | $\mu$<br> <br>? o p a - t - m e ? | $\mu$ $\mu$<br> <br>? o p a - t - m e ?     | $\mu$ $\mu$<br> <br>? o p a - t - m e ?     | *Float- $\mu$ | * $(\mu\mu)\sigma$ | *V $_{\text{;}}$ | Dep- $\mu$ | *V $^{\mu}_{\text{only}}$ |
|----|-----------------------------------|---|---|---------------|--------------------|------------------|------------|---------------------------|
| a. | $\mu$<br> <br>? o p a t m e ?     | $\mu$ $\mu$ $\mu$<br> <br>? o p a t m e ?   | $\mu$ $\mu$<br> <br>? o p a t m e ?         |               | *!                 | *                |            |                           |
| b. | $\mu$<br> <br>? o p a t + m e ?   | $\mu$ $\mu$ $\mu$<br> <br>? o p a t + m e ? | $\mu$ $\mu$<br> <br>? o p a t + m e ?       |               |                    | *                |            | *                         |
| c. | $\mu$<br> <br>? o p a t + m e ?   | $\mu$ $\mu$ $\mu$<br> <br>? o p a t + m e ? | $\mu$ $\mu$ $\mu$<br> <br>? o p a t + m e ? |               |                    | **!              | *!         |                           |

☞ such a ranking predicts SSM' where epenthetic vowels are exempt from morphological lengthening

But what about a low-ranked  $*V^{\mu}_{\text{only}}$  in SSM'?

(37)

|    |  | *Float- $\mu$ | * $(\mu\mu\mu)_{\sigma}$ | *V $_i$ | Dep- $\mu$ | *V $^{\mu}_{\text{only}}$ |
|----|--|---------------|--------------------------|---------|------------|---------------------------|
|    |  |               |                          |         |            |                           |
| a. |  | * $!_i$       |                          |         | **         |                           |
| b. |  |               |                          |         | *          | *                         |
| c. |  |               |                          | * $!_i$ | ** $!_i$   |                           |

such a ranking predicts SSM' where certain (lexically arbitrary classes of) vowels are exempt from morphological lengthening

## Exceptions to morphological lengthening in Diegueno

(Walker, 1970; Langdon, 1970; Miller, 1999; Wolf, 2007; de Lacy, 2012)

- ☞ there are 9 strategies to form plural of N/V in various combinations
- ☞ the most frequent one is vowel lengthening (38-a), sometimes cooccurring with other strategies as well (38-b)
- ☞ for one lexical class of stems, lengthening is absent (38-c)

(38) Plural: Vowel lengthening in Diegueno (Walker, 1970; Wolf, 2007)

|    |         |                    |                           |      |
|----|---------|--------------------|---------------------------|------|
| a. | tʃu:puʔ | tʃu:p <u>u</u> :ʔ  | 'to boil'                 | Wa7  |
|    | ʃu:piʔ  | ʃu:p <u>i</u> :ʔ   | 'to close'                | Wa7  |
|    | ʔap     | ʔ <u>a</u> :p      | 'to burn'                 | Wa7  |
| b. | ka:kap  | neka:k <u>a</u> :p | 'to go around'            | M105 |
|    | xtup    | xu:t <u>u</u> :p   | 'to jump'                 | M105 |
| c. | jil     | atʃu:jil           | 'to carry (load) on back' | M105 |
|    | uʔux    | tʃuʔux             | 'to cough'                | M103 |

Low-ranked  $*V^\mu$ <sub>only</sub>: Exceptions to morphological lengthening

(39)

|    |               | *Float- $\mu$ | *V <sub>i</sub> | *V $^\mu$ <sub>only</sub> |
|----|---------------|---------------|-----------------|---------------------------|
|    | j i   - $\mu$ |               |                 |                           |
| a. |               |               | *!              |                           |
| b. |               |               |                 | *                         |

## Short epenthesis and morphological lengthening in Arbizu Basque (Hualde, 1990, 2012; Artiagoitia, 1993; Hualde and Ortiz de Urbina, 2003, 283)

(40) Gen.Indef: Suffixes trigger lengthening (Hualde, 1990, 283)

|       |                   |            |
|-------|-------------------|------------|
| alaba | alab <b>a</b> :n  | 'daughter' |
| pa:te | pa:te <b>e</b> :n | 'wall'     |
| asto  | asto <b>o</b> :n  | 'donkey'   |
| mendi | mendi <b>i</b> :n | 'mountain' |

☞ V-epenthesis in Arbizu Basque: A nasal can never be the second part of a coda cluster

(41) Morphological lengthening: Short epenthetic V (Hualde, 1990, 283)

|         |                   |       |
|---------|-------------------|-------|
| txakur: | txakur <b>e</b> n | 'dog' |
| gizon   | gizon <b>e</b> n  | 'man' |

Low-ranked  $*V^\mu$  only: Short epenthesis and morphological lengthening

(42)

|    | $\mu$ | $\mu$ | $\mu$ |   | *Cn. | *Float- $\mu$ | Dep-S | *V <sub>i</sub> | *V $^\mu$ only |
|----|-------|-------|-------|---|------|---------------|-------|-----------------|----------------|
|    | g     | i     | z     | o | n    | -             | n     |                 |                |
| a. | g     | i     | z     | o | n    | n             |       | *               |                |
| b. | g     | i     | z     | o | n    | e             | n     | *               | *              |
| c. | g     | i     | z     | o | n    | e             | n     | *               | *!             |

Factorial typology of  $*V^{\mu}$ <sub>only</sub>:

## Correlating exceptions and long epenthesis

- 👉 long epenthesis correlates with the absence of exceptions to morphological lengthening (Zimmermann, 2017)

## (43) Morphological lengthening: Possible outcomes

|                           | $*V^{\mu}$ <sub>only</sub> $\gg$ $*V:$<br>e.g. Southern Sierra Miwok | $*V:$ $\gg$ $*V^{\mu}$ <sub>only</sub><br>e.g. Diegueno, Arbizu Basque |
|---------------------------|--|--|
| V class 1 (ul. $\mu$ )    | long   | long   |
| V class 2 (no ul. $\mu$ ) | long   | short  |
| Epenthetic vowel          | long   | short  |

## Summary

- 🌀 there is a mapping between morphological and prosodic structure on tiers lower than the prosodic foot
- 🌀 argument for the constraints  $*V^\mu / *V^\mu_{\text{only}}$  that penalize heteromorphemic mora integration:
  - ① coexisting long vowels and vowel hiatus across morpheme boundaries
    - Align also does that but 1) cannot predict the other patterns, and 2) is non-local (relating segments and syllables)
  - ② the existence of long epenthetic vowels
  - ③ solves a RotB problem for morphological lengthening accounts
  - ④ the correlation between short epenthesis and exceptions to morphological lengthening



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## Combinations of heteromorphemic $\mu$ -association?

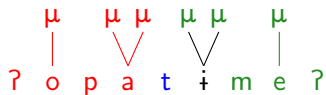
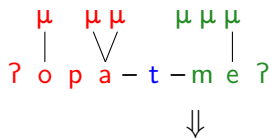
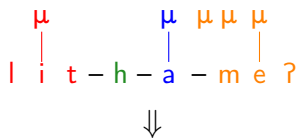
### (44) Typology of heteromorphemic vowel lengthening

| CL  | ML  |                                   |
|---|---|-----------------------------------|
|  |  | e.g. Bukusu (Mutonyi, 2000)       |
|  |  | e.g. Arbizu Basque (Hualde, 1990) |
|  |  | e.g. Cilungu (Bickmore, 2007)     |
|  |  | e.g. Emai (Casali, 1996)          |

-  a  $\mu$  in a morphological lengthening context is underlyingly unassociated: Its association is enforced by an additional constraint  
 \*Floating  $\mu$  vs. \*Floating  $\mu$  that is underlyingly unassociated  
 → **ML can exist without CL**
-  no ML = absence of a floating  $\mu$  in morpheme representations  
 → **CL can exist without ML**

SSM: Two floating  $\mu$ 's as an alternative?

(45)



SSM: Two floating  $\mu$ 's as an alternative?

- 'over-lengthening' in contexts where a moraic vowel precedes a lengthening affix is mispredicted

(46)

|    |  |               |                           |                 |
|----|--|---------------|---------------------------|-----------------|
|    | $\begin{array}{ccccccc} & \mu & & \mu & & \mu & \mu & \mu \\ &   & &   & &   &   &   \\ C & V & C & V & C & - & V & - & m & e & ? \end{array}$     | *Float- $\mu$ | *( $\mu\mu\mu$ ) $\sigma$ | *V <sub>i</sub> |
| c. | $\begin{array}{ccccccc} & \mu & & \mu & & \mu & \mu & \mu & \mu \\ &   & &   & &   &   &   &   \\ C & V & C & V & C & V & m & e & ? \end{array}$   | *!            |                           | *               |
| d. | $\begin{array}{ccccccc} & \mu & & \mu & \mu & \mu & \mu & \mu \\ &   & & \vee & \vee &   &   &   \\ C & V & C & V & C & V & m & e & ? \end{array}$ |               |                           | **              |