

# Long vowel epenthesis

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## The phenomenon: long epenthesis

(1) *Additive affixes in Southern Sierra Miwok* (Broadbent 1964)

a.	lit-h-a-:meʔ	litha:meʔ	'it's risen on us'	63
	kel:a-na-:meʔ	kel:ana:meʔ	'It snowed on us'	63
b.	ʔumu:c-:meʔ	ʔumu:ci:meʔ	'it's raining on us'	63
	ʔopa:-t-:meʔ	ʔopati:meʔ	'it's clouding up on us'	63

- long epenthetic vowels as result of morphological lengthening face a serious opacity problem in standard parallel OT accounts

## Main Claim I

- an argument for **morpheme-contiguous prosodic licensing**

(2)



Assign a violation mark for every  $V_i$  that is only dominated by  $\mu$ 's affiliated with another morpheme  $\mu_k$

- the constraint correctly predicts a two-fold typology: languages with morph-contiguous moraic licensing and those with alternating licensing
- alternative accounts (that solve the general opacity problem of opaque  $\mu$ -licensing in OT) fail to predict long epenthesis

## Epenthetic vowels

(cf., for example, Piggott 1995, Vaux 2002, Hall 2011)

- ... “repair an input that does not meet a language’s structural requirements” (Hall 2011:2576)
- have either a fixed (default) value or the quality is determined by its phonological context
- opaque for many processes (stress and/or segmental processes)

# Opaque vowel epenthesis in Dutch

(Booij 1995, Hall 2006, Hall 2011)

- optional deletion of /n/ before /ə/
- such deletion is impossible before an epenthetic /ə/

## (3) /n/ deletion in Dutch

- |    |       |                     |           |
|----|-------|---------------------|-----------|
| a. | reʧən | reʧən ~ reʧə        | ‘rain’    |
|    | horən | horən ~ horə        | ‘to hear’ |
| b. | horn  | horn ~ horən ~ horə | ‘horn’    |

## Opaque vowel epenthesis: possible accounts

- epenthetic vowels are defective, they lack a  $\mu$  (e.g. Piggott 1995)
- they are inserted at a later stage in the derivation

→ **This talk:**

**Epenthetic vowels are inserted ‘too late’.**

They project an epenthetic  $\mu$  at a point in the derivation where there is an additional (floating)  $\mu$  anyway.

# Gidabal

(Geytenbeek&Geytenbeek 1971, Kenstowicz&Kisseberth 1977)

- the imperative is formed via lengthening of the final vowel – a process that has no independent phonological motivation

(4) *Addition in Gidabal* (Geytenbeek&Geytenbeek 1971:21-24)

BASE		IMPERATIVE
gida	‘to tell’	gida:
ma	‘to put’	ma:
jaga	‘to fix’	jaga:
ga:da-li-wa	‘to keep on chasing’	ga:daliwa:

## Diegueno

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

- there are 9 strategies to form plural of N/V in various combinations
- the most frequent one is vowel lengthening (5-a), sometimes cooccurring with other strategies as well (5-b)
- for some lexically marked stems, lengthening is absent (5-c)

### (5) *Addition in Diegueno*

(Walker 1970, Wolf 2007)

	Base	PLURAL		
a.	tʃu:puɫ	tʃu:pu:ɫ	‘to boil’	Wa7
	ʃu:piɾ	ʃu:pi:ɾ	‘to close’	Wa7
	ɬap	ɬa:p	‘to burn’	Wa7
b.	ka:kap	neka:ka:p	‘to go around’	M105
	xtup	xu:tu:p	‘to jump’	M105
c.	jil	aɬʃu:jil	‘to carry (load) on back’	M105
	uʔux	tʃuʔux	‘to cough’	M103



## La Paz Aymara

(England 1971, Briggs 1976, Hardman 2001+et al.2001, Adelaar&Muysken 2004)

- the verbalizer is marked via lengthening of the final base vowel (6-a)
- in some morphological contexts, this lengthening is absent (6-b)

(6) *Addition in La Paz Aymara* (Briggs 1976, Hardman et al. 2001)

	BASE		VERBALIZED FORM		
a.	wawa	'baby'	wawa: <b>a</b> :ŋa	'to be a baby'	H89
	uta	'house'	uta: <b>a</b> :ŋa	'to be a house'	E11
			(/–ŋat/ 'Inf')		
b.	warmi	'women'	warm <b>i</b> twā	'I am a women'	B171
	jatitʃiri	'teacher'	jatitʃ <b>i</b> ritwā	'I am a teacher'	H20
			(/–t/ '1>3' /–wa/ 'FS')		

## Arbizu Basque

(Hualde 1990, Weijer 1992, Artiagoitia 1993, Hualde&Urbina 2003, Hualde 2012)

- the genitive indefinite (&superlative) suffix /-n/ triggers V-lengthening (7-a) or insertion of unmarked /e/ (7-b)
- ➔ this V-epenthesis is independently motivated since a nasal can never be the second part of a coda cluster

### (7) Additive Suffixes in Arbizu Basque

(Hualde 1990:283)

	BASE	GEN.INDEF		
a.	alaba	alaba:n	'daughter'	<i>V-final</i>
	parte	parte:n	'wall'	
	asto	asto:n	'donkey'	
	mendi	mendi:n	'mountain'	
b.	txakur:	txakur:en	'dog'	<i>C-final</i>
	gizon	gizonen	'man'	

## A footnote on Arbizu Basque

- the possible alternative analysis that the morphemes are /-en/ and total vowel assimilation applies in case the stem is V-final is unplausible given the fact that other V-initial suffixes trigger other rules than total V-assimilation, cf. (8)

(8) *V-initial suffixes /-a/ and /-en/* (Hualde 1990:281+283)

	BASE	ABS.SG	GEN.PL		
a.	alaba	alaba	alaben	'daughter'	<i>V-final</i>
	pa:te	pa:tia	pa:tien	'wall'	
	asto	astua	astuen	'donkey'	
	mendi	mendija	mendijen	'mountain'	
b.	txakur:	txakur:a	txakur:en	'dog'	<i>C-final</i>
	gizon	gizona	gizonen	'man'	

## Huallaga Quechua

(Weber 1947+1996, Adelaar 1984, Adelaar&Muysken 2004)

- first person (on verbs or as possessor on nouns) is expressed via lengthening of the final base V (9-a) or realization of a long /-ni:/ (9-b)

### (9) *Addition in Huallaga Quechua*

(Weber 1947&1996, Adelaar 1984)

	BASE		1.Sc	
a.	wata	‘tie’	wata: <b>a</b> :	A189
	wata-ra	‘tied’	watara: <b>a</b> :	A219
	ka	‘be’	ka: <b>a</b> :	W96:246
	waska	‘rope’	waska: <b>a</b> :	A189
	uma	‘cabeza’ (=head)	uma: <b>a</b> :	W96:97
b.	majur	‘mayor’ (=chairman)	majur <b>ni</b> :	W96:97
	hatun	‘big’	hatun <b>i</b> :	W47:465

## /-ni/ in Huallaga Quechua

- a “vacuous default morpheme” (CerronPalomino 2008:87) or “connective element” (Adelaar 1984)
- it is inserted for purely phonological reasons: the language doesn’t allow any consonant clusters and no V:C-syllables

(10) *Insertion of /-ni/* (Weber 1947:465)

maqa-ma-q-ntsi:	maqamaq <b>n</b> intsi:	‘the one who hit us (incl)’
ñatin-jnaq	ñatin <b>:ij</b> naq	‘not having a liver’
papa:-n	papa: <b>n</b> in	‘his father’

# A typology of morphological vowel epenthesis

(11)

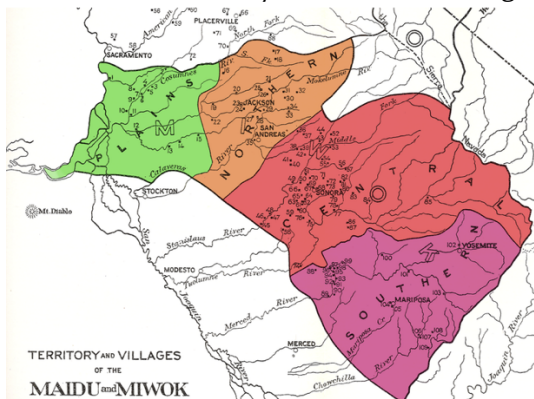
Context I	Context II	Example	
	<b>Long</b> underlying V	Gidabal	morph-contiguous
<b>Long</b> underlying V	<b>Short</b> underlying V	Diegueno, LP Aymara	Alternating
<b>Long</b> underlying V	<b>Short</b> epenthetic V	Arbizu Basque	$\mu$ licensing
<b>Long</b> underlying V	<b>Long</b> epenthetic V	Huallaga Quechua	$\mu$ licensing

## 👉 A case study: Southern Sierra Miwok

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## Southern Sierra Miwok (=SSM)

- a few semispeakers or passive speakers today (Hinton 1994, Golla 2011)
- one of five moderately diverse Miwok languages (Yokuts-Utian)





## Phonological Background I

(Freeland 1951, Broadbent 1964, Callaghan 1987, Sloan 1991)

- syllables:
  - light: CV, CVC#
  - heavy: CVC, CV:, CV:C#, CVCC#
  - no clusters, obligatory onsets
  - moraic codas, extrametrical final C, maximally bimoraic syllables
- epenthesis of /ʔ/ or /ɨ/

(12) *Phonological vowel epenthesis in SSM*

(Broadbent 1964:20)

UNDERLYING	SURFACE	
he:l-ma:	he:lɨma:	'I am fighting'
hikaHh-j	hikahɨj	'deer' (Acc)

## Phonological Background II

(Freeland 1951, Broadbent 1964, Callaghan 1987, Sloan 1991)

- main stress on the first heavy syllable and necessarily on the first or second syllable
- iambic lengthening: vowel lengthening of the second V if neither the first nor second syllable is heavy (Hayes 1995, Buckley 1998)
- ➔ additional morphologically triggered lengthening that cannot be the result of iambic lengthening

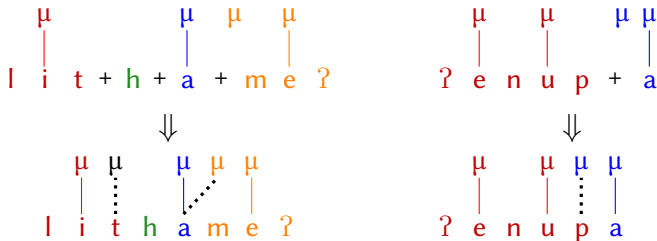
## SSM Additive morphological length manipulation I

- (13) *Additive affixes: vowel lengthening* (Broadbent 1964)
- |               |             |                    |    |
|---------------|-------------|--------------------|----|
| lit-h-a-:meʔ  | litha:meʔ   | ‘it’s risen on us’ | 63 |
| kel:a-na-:meʔ | kel:ana:meʔ | ‘It snowed on us’  | 63 |
| wile:p-a-:meʔ | wile:pa:meʔ | ‘it flashed no us’ | 63 |
- (14) *Additive affixes: gemination* (Broadbent 1964)
- |                  |               |                    |     |
|------------------|---------------|--------------------|-----|
| ʔenup-:e-ni:te-ʔ | ʔenup:eni:teʔ | ‘I chased you’     | 48  |
| halik- :e-te-ʔ   | halik:eteʔ    | ‘I hunted’         | 106 |
| jo:h-:a-ci-ʔ-hY: | jo:h:aciʔhY:  | ‘it was killed’    | 119 |
| jo:h-k-:a-ko:    | jo:huk:ako:   | ‘they were killed’ | 82  |
- (15) *Addition: vowel lengthening* (Broadbent 1964)
- |             |          |                        |    |
|-------------|----------|------------------------|----|
| wɪn-si-na-: | wɪnsina: | ‘he just now came’     | 84 |
| ʔam:u-k-a-: | ʔam: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 |

## A $\mu$ -affixation analysis for SSM I

- non-concatenative morphology as epiphenomenon: follows assuming the independently motivated principles of phonological theory (e.g. Lieber 1992, Stonham 1994, Trommer 2011, Bermúdez-Otero 2012, Bye&Svenonius 2012)
- $\mu$ -affixation for lengthening morphology (Samek-Lodovici 1992, Davis&Ueda 2002+2006, Bye&Svenonius 2012, Grimes 2002, Wolf 2007, Topintzi 2008, Flack 2007, Yoon 2008, Kirchner 2007+2012, among others)

(16)



## The choice between vowel lengthening and gemination?

- C-initial suffixes trigger vowel lengthening & V-initial ones gemination?
- predicted from the general syllable structure of SSM given that:
  - the affix  $\mu$  cannot ‘jump’ over the final base  $\mu$
  - it cannot associate to segments of the additive affix
  - gemination is in principle preferred to realize an additional  $\mu$

### (17) *Additive affixes: the choice between VL & Gemination*

BASE	AFFIX	
V	C	only VL possible
VC	C	lengthening would result in trimoraic $\sigma$
:C/CC	C	illicit trimoraic $\sigma$
V	V	illicit hiatus
VC	V	G is possible
:C/CC	V	lengthening would result in trimoraic $\sigma$


A  $\mu$ -affixation analysis in OT

(In all following tableaux/depictions, WBP  $\mu$ -assignment to coda consonants is silently assumed)

(18) *Vowel lengthening*

	$\mu$   l i t + h + a + m e ?	*FLOAT	* $\begin{smallmatrix} \sigma \\ \mu\mu\mu \end{smallmatrix}$	*V:	*C $\mu$
a.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$                   l i t h a m e ?	*!			
b.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$                   l i t h a m e ? <small>(arrow from <math>\mu</math> above 'a' to <math>\mu</math> above 'm')</small>				*

A  $\mu$ -affixation analysis in OT(19) *Gemination*

	$\mu$ $\mu$ $\mu$ $\mu$                 ? e n u p + a	*FLOAT	* $\begin{matrix} \sigma \\ \mu\mu\mu \end{matrix}$	*V:	*C $\mu$
a.	$\mu$ $\mu$ $\mu$ $\mu$                 ? e n u p a	*!			
 b.	$\mu$ $\mu$ $\mu$ $\mu$                 ? e n u p a				*
b.	$\mu$ $\mu$ $\mu$ $\mu$                 ? e n u p a			*!	

## A general opacity problem arising from Richness of the Base

- $\mu$ 's on short vowels (and codas in weight-sensitive languages) are non-contrastive = not necessarily part of the underlying representation

(20)

	$\mu$  l i t + h + a + m e ?	*FLOAT	* $\sigma$ $\mu\mu\mu$	DEP $\mu$	*V:
a.	$\mu$  l i t h a m e ?	*!			
b.	 l i t h a m e ?				
c.	 l i t h a m e ?			*!	*



## A footnote on DEP- $\mu$

- ➔ even if the insertion of  $\mu$  is not penalized by DEP- $\mu$ , the counterbleeding candidate is harmonically bound by \*V:
- it has been argued that general DEP- $\mu$ /DEP-LINK- $\mu$  are potentially problematic since they predict unattested syllabification and weight contrasts  
(Bermúdez-Otero 1999, Campos-Astorkiza 2004)
- the modified P-DEP- $\mu$  version only penalizing the insertion of non-positional  $\mu$ 's (=those that are not the only prosodic node directly dominating a segment) is violated in (20) as well  
(Bermúdez-Otero 1999+2001, Campos-Astorkiza 2003+2004, Topintzi 2006+2010)

## A rule-based account

(21) i. Underlying:

l i t + h + a + m e ?

ii. Link  $\mu$ -less Vs to epenthetic  $\mu$ 's:

l i t h a m e ?

iii. Associate unassociated  $\mu$ 's:

l i t h a m e ?

- lengthening arises since rule ii. is ordered before rule iii.: an instance of **counterbleeding** (Kiparsky 1973, McCarthy 2007, Bakovic 2011)

## Possible solutions to this opacity problem

- there is no opacity problem

*“Lexicon Optimization will cause even short vowels – whose mora count is predictable – to be prespecified as well.” (Inkelas 1995:15)*

→ all predictable non-alternating structure is lexically stored  
(cf. also Bermúdez-Otero 1999)

- stratal OT
- Harmonic Serialism

## SSM Additive morphological length manipulation II

- if phonologically motivated epenthesis applies before an additive affix, a **long epenthetic segments surface**

(22) *Long epenthesis*

(Broadbent 1964, Sloan 1991)

a.	ʔumu:c-:meʔ	ʔumu:c <i>i</i> :meʔ	‘it’s raining on us’	B63
	ʔopa:-t-:meʔ	ʔopa:t <i>i</i> :meʔ	‘it’s clouding up on us’	B63
b.	le:le:-ni-:a	le:le:niʔ:i:a	‘school’	S29
	ʔese:l-ŋHe-:a-ci-ʔ-hi:	ʔese:lŋeʔ:i:aciʔhi:	‘his birth’	B119

## Yet another opacity problem for a $\mu$ -affixation analysis

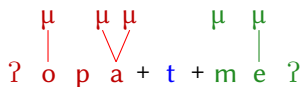
- a second  $\mu$  dominating the epenthetic vowel?

(23)

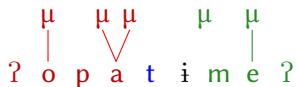
	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\uparrow$ $\vee$ $\uparrow$ ? o p a + t + m e ?	*FLOAT	* $\sigma$ $\mu\mu\mu$	DEP $\mu$	*V:
a.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\uparrow$ $\vee$ $\vdots$ $\uparrow$ $\uparrow$ ? o p a t m e ?	*!	*		
b.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\uparrow$ $\vee$ $\vdots$ $\uparrow$ $\uparrow$ ? o p a t i m e ?				
c.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\uparrow$ $\vee$ $\vee$ $\uparrow$ $\uparrow$ ? o p a t i m e ?			*!	*

## A rule-based analysis

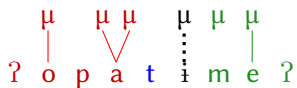
(24) i. Underlying:



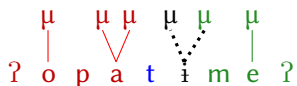
ii. Insert V to avoid illicit CVVC:



iii. Link μ-less Vs to epenthetic μ's:



vi. Associate unassociated μ's:



## SSM Additive morphological length manipulation III

- if addition is expected for a base that ends in a consonant cluster, a final **long epenthetic vowel** is realized

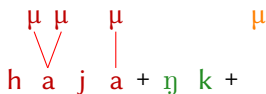
(25) *Addition in Southern Sierra Miwok: long epenthesis* (Broadbent 1964:82)

ha:ja-ŋk-:	ha:jaŋki:
daylight-VB-3.Sc	'it is daylight'

- vs. the contexts in (25): this epenthetic vowel has no independent (phonological) motivation!

## A rule-based analysis

(26) i. Underlying:



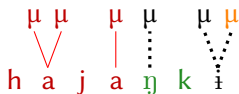
ii. Insert a V for every unassociated μ:



iii. Link μ-less Vs to epenthetic μ's:



vi. Associate unassociated μ's:





## Morph-contiguous prosodic licensing

- A phonological element on tier  $n$  is only dominated by prosodic nodes on tier  $n+x$  that are not affiliated with another morpheme.
- ~ MORPHEMECONTIGUITY across prosodic tiers

(27)



Assign a violation mark for every  $V_i$  that is only dominated by  $\mu$ 's affiliated with another morpheme  $\mu_k$

- = every  $V$  must be dominated by at least one  $\mu$  that has the same morphological affiliation or no morphological affiliation at all

## The constraint refers to...

- (morphological ‘colours’=all elements belonging to one morpheme can be identified by a morph-contiguous colour and epenthetic elements lack a colour (Oostendorp 2006)
- bidirectional parsing constraints demanding strict/weak prosodic layering  
cf. LICENSE-X (Kiparsky 2003), HEADEDNESS (Selkirk 1995), or PARSE-INTO-X (Spaelti 1994, Ito&Mester 2009)

# V → μ and underlyingly m-less vowels

(28)

	*FLOAT			DEP μ
a.	*!			
b.		*!		
				*

# V → μ and epenthetic vowels I

(29)

		*FLOAT			DEP S	DEP μ
a.		*!		*		*
b.			*!		*	
☞ c.					*	*

# V → μ and epenthetic vowels II

(30)

				DEP S	DEP μ
a.					*
b.				*	*
c.				*	**

## Goldrick 2000 – a similar constraint?

(31)

V-Wt↑ All vowels must project their own  $\mu$ .

- in Turbidity Theory: a containment-based theory where association lines are replaced by pronunciation (=visible for phonetics) and projection (=abstract) relations
- (31) demands a *projection line* between a vowel and a  $\mu$
- Goldrick's analysis of CL in Luganda: V-Wt↑ forces a vowel that is not realized on the surface to project a  $\mu$
- it does not refer to morphological affiliation and cannot solve the problem of opaque  $\mu$  projection

## Alternative accounts

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Not one  $\mu$  affix – two  $\mu$ 's!

(32)

$\mu$                      $\mu$   $\mu$   $\mu$   $\mu$   
 |                    |    |    |  
 l i t + h + a + m e ?



$\mu$   $\mu$      $\mu$   $\mu$   $\mu$   $\mu$   
 |    |    |    |    |  
 l i t h a m e ?

$\mu$      $\mu$   $\mu$              $\mu$   $\mu$   $\mu$   
 |    |    |            |    |    |  
 ? o p a + t + m e ?



$\mu$      $\mu$   $\mu$      $\mu$   $\mu$      $\mu$   
 |    |    |    |    |    |  
 ? o p a t i m e ?




Two  $\mu$ 's: lengthening of an underlying vowel

(33)

		$^*$ 	*FLOAT	*V:
a.			**!	
b.		*!		*
c.			*	*

Two  $\mu$ 's: lengthening of an epenthetic vowel

(34)

	$\begin{array}{ccccccc} & \mu & \mu & \mu & & \mu & \mu & \mu \\ &   & \vee & & &   & & \\ ? & o & p & a & + & t & + & m & e & ? \end{array}$	$* \begin{array}{c} \sigma \\ \mu \mu \mu \end{array}$	*FLOAT	*V:
a.	$\begin{array}{ccccccc} & \mu & \mu & \mu & \mu & \mu & \mu \\ &   & \vee & \vdots & &   & \\ ? & o & p & a & t & m & e & ? \end{array}$	*!	**	*
 b.	$\begin{array}{ccccccc} & \mu & \mu & \mu & \mu & \mu & \\ &   & \vee & \vdots & &   & \\ ? & o & p & a & t & i & m & e & ? \end{array}$			**

## But...

- ...we know that epenthesis is allowed to ensure that the  $\mu$  ('s) is/are realized – a misprediction arises:

- (35) *Long epenthesis, cf. (20)* (Broadbent 1964, Sloan 1991)
- a.  $\text{?opa:} - \text{t} - \text{:me?}$      $\text{?opa:ti:me?}$     'it's clouding up on us'    B63
- b.  $\text{le:le:} - \text{ni} - \text{:a}$      $\text{le:le:ni?:a}$     'school'    S29

		$\begin{matrix} * \\ \sigma \\ \mu\mu\mu \end{matrix}$	*FLOAT	DEP S	*V:
c.			*!		*
d.				**	*

## Stratal OT

(e.g. Kiparsky 2000, Bermúdez-Otero to appear)

- 🦋 ‘Egalitarian Stratal OT’: At every stratum, all independent morphological objects undergo phonological evaluation (i.e. all morphological objects which are not part of other morphological objects) (Trommer 2011:72)
- ➔ morphemes are evaluated prior to concatenation and hence enter the derivation (fully) prosodified

# The solution to the general opacity problem in Stratal OT

## (36) *Stratum 1: Lexical Array*

	$\mu$     i t	$\mu$ $\updownarrow$ V	WbP	DEP $\mu$		$\mu$ $\updownarrow$ V	WbP	DEP $\mu$	
a.	$\mu$     i t		*!		a.		*!		...
☞ b.	$\mu$ $\mu$     i t			*	☞ b.	$\mu$ ⋮ a		*	

→ no  $\mu$ -less vowel enters the derivation of morphologically complex forms

## The failure of stratal OT to predict long epenthesis

- The epenthetic vowel is not motivated/inserted before the additive affix/addition context is present

→ **Epenthesis applies ‘too late’**

(37)

$\mu$     $\mu$   $\mu$     $\mu$   $\mu$   
 |   / \   |  
 ? o p a + t + m e ?

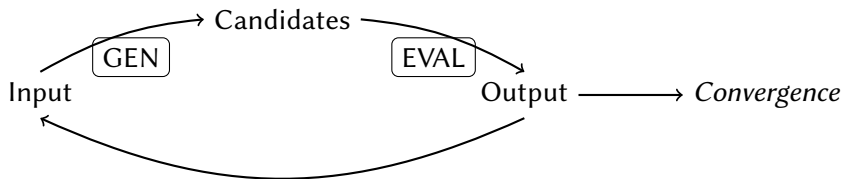
⇓

$\mu$     $\mu$   $\mu$     $\mu$   $\mu$     $\mu$   
 |   / \   / \   |  
 ? o p a t i m e ?

## Harmonic Serialism

(Prince&Smolensky 1993, McCarthy 2008 et seq.)

- GEN is restricted: only a single step/operation applies to form candidates
- serial optimization: each step in a HS derivation is more harmonic than the step preceding it



## Gradualness

- (38) *Faithfulness-based* (McCarthy 2008+2010, Elfner 2013)  
 Candidates differ from their input only by a single violation of a basic faithfulness constraint.  
 → Syllabification (=insertion of  $\mu$ 's) is never contrastive hence comes for free
- (39) *Operation-based* (Elfner 2009, Pater 2012, Pruitt 2012, Torres-Tamarit 2012)  
 Candidates differ from their input only by the application of one phonological operation.  
 → Syllabification (=insertion of  $\mu$ 's) is a phonological operation



# Optimal Interleaving

(Wolf 2008)

- insertion of a morpheme is one step

(40)



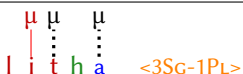
MAX  
F

For every instance  $\varphi$  of the feature F at the morpheme level, assign a violation-mark if there is not an instance  $\varphi'$  of F at the morph level, such that  $\varphi \preceq \varphi'$ .

(Wolf 2008:26)

HS and opaque  $\mu$  licensing: Faithfulness-based gradualness

(41)

	MAX AFX	PARSE S	*FLOAT	*V:
i. First* Step: 				
a. 	**!			
b. 	*			

(\*Not the first step: stem and one affix are already inserted)

HS and opaque  $\mu$  licensing: Faithfulness-based gradualness, contd.


(42)

	MAX AFX	PARSE S	*FLOAT	*V:
ii. Second Step: $\begin{array}{ccccc} \mu & \mu & & \mu & \\   &   & \dots &   & \\ l & i & t & h & a \end{array} <3SG-1PL>$				
a. $\begin{array}{ccccc} \mu & \mu & & \mu & \\   &   & \dots &   & \\ l & i & t & h & a \end{array} <3SG-1PL>$	*!			
$\Rightarrow$ b. $\begin{array}{ccccccc} \mu & \mu & & \mu & \mu & \mu & \\   &   & \dots &   &   &   & \\ l & i & t & h & a & m & e ? \end{array}$			*	
iii. Third Step				
a. $\begin{array}{ccccccc} \mu & \mu & & \mu & \mu & \mu & \\   &   & \dots &   &   &   & \\ l & i & t & h & a & m & e ? \end{array}$			*!	
$\Rightarrow$ b. $\begin{array}{ccccccc} \mu & \mu & & \mu & \mu & \mu & \\   &   & \dots &   &   &   & \\ l & i & t & h & a & m & e ? \end{array}$				*

## HS and opaque $\mu$ licensing: Faithfulness-based gradualness, contd.

- long epenthesis is predicted if insertion of epenthesis and parsing into prosodic structure (+insertion of a  $\mu$ ) is one step

(43)

	MAX AFX	* $\sigma$ $\mu\mu\mu$	PARSE S	*FLOAT	*V:	DEP S
i. First* Step: $\mu$ $\mu$ $\mu$ $\mu$ ? o p a t <3SG-1PL>						
a. $\mu$ $\mu$ $\mu$ $\mu$ ? o p a t <3SG-1PL>		*!			*	
 b. $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ ? o p a t m e ?		*	*		*	
a. $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ $\mu$ ? o p a t i <3SG-1PL>		*!			*	*

HS and opaque  $\mu$  licensing: Faithfulness-based gradualness, contd.

(44)

	MAX AFX	* $\sigma$ $\mu\mu\mu$	PARSE S	*FLOAT	*V: S	DEP S
ii. Second Step: $\mu$ $\mu\mu$ $\mu\mu$ ? o p a t m e ?						
a. $\mu$ $\mu\mu$ $\mu\mu$ ? o p a t m e ?		*!		*	*	
b. $\mu$ $\mu\mu$ $\mu\mu$ ? o p a t i m e ?				*	*	*
iii. Third Step						
a. $\mu$ $\mu\mu$ $\mu\mu$ ? o p a t i m e ?				*!	*	*
b. $\mu$ $\mu\mu$ $\mu\mu$ ? o p a t i m e ?					**	*

## But ...

- there are multiple arguments that the operation-based theory of gradualness makes the empirically more adequate predictions (cf., for example, Elfner 2009, Pater 2012, Pruitt 2012, Torres-Tamarit 2012)
- and there are concrete arguments against the assumption that insertion of an epenthetic segment and its prosodification is one step
  - The typology of epenthetic vowel and the insights that some are best analysed as  $\mu$ -less! E.g. Arbizu Basque
  - Epenthesis never resolves metrical markedness (Moore-Cantwell 2012)

## HS and opaque $\mu$ licensing: Operation-based gradualness

- = syllabification/insertion of a  $\mu$  is a step on its own
- the crucial decision: is insertion of morphemes more important or providing  $\mu$ -less vowels with  $\mu$ 's?

MAX-F  $\gg$  V  $\longrightarrow$   $\mu$

- 
- all morphemes are inserted before  $\mu$ -less vowels are supplied with  $\mu$ 's
  - **the same opacity problem as in parallel OT**

V  $\longrightarrow$   $\mu$   $\gg$  MAX-F

- 
- $\mu$ -less vowels are never inserted
  - **no opacity problem arises**

## HS and opaque $\mu$ licensing: Operation-based gradualness

- to solve the opacity problem for long epenthesis, epenthetic vowels are necessarily inserted together with a  $\mu$  as well
- ➔ an empirical problem (epenthetic vowels are *never*  $\mu$ -less)
- ➔ a theoretical problem: epenthetic vowels are ‘stored’ together with a  $\mu$  in the lexicon?



## Summary

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## The theoretical proposal

- morph-contiguous prosodic licensing solves the opacity problem of long epenthetic vowels in morphological lengthening contexts
- alternative accounts that can solve the general opacity problem of  $\mu$ -affixation fail to predict long epenthesis
- re-ranking of  $\vee \rightarrow \mu$  predicts languages with short epenthesis, i.e. **Alternating lengthening**

The predictions of  $\vee \rightarrow \mu$ : Alternating lengthening(45) *Epenthesis in Arbizu Basque*

	$\mu$   $\mu$   $\mu$ g   i   z   o   n + n	*CN.	*FLOAT	DEP S	*V:	$\mu$ ↑ V
a.	$\mu$   $\mu$   $\mu$ g   i   z   o   n   n	*!			*	
b.	$\mu$   $\mu$   $\mu$ g   i   z   o   n   e   n			*		*
c.	$\mu$   $\mu$   $\mu$   $\mu$ g   i   z   o   n   e   n			*	*!	

The predictions of  $\vee \rightarrow \mu$  : Alternating lengthening(46) *Lexical exceptions in Diegueno*

		*FLOAT	*V:	$\mu$ ↑ $\vee$
	j i l + <span style="float: right;"><math>\mu</math></span>			
a.			*!	
☞ b.				*

## A typology of morphological vowel epenthesis

(47)

Context I	Context II	Example	
	<b>Long</b> underlying V	Gidabal	$V \rightarrow \mu \gg *V:$
<b>Long</b> underlying V	<b>Short</b> underlying V	Diegueno, LP Aymara	$*V: \gg V \rightarrow \mu$
<b>Long</b> underlying V	<b>Short</b> epenthetic V	Arbizu Basque	$*V: \gg V \rightarrow \mu$
<b>Long</b> underlying V	<b>Long</b> epenthetic V	Huallaga Quechua, SSM	$V \rightarrow \mu \gg *V:$