Containment as the key to the 'heavy-vs-long' geminate debate

mfm 23

May 28th, 2015

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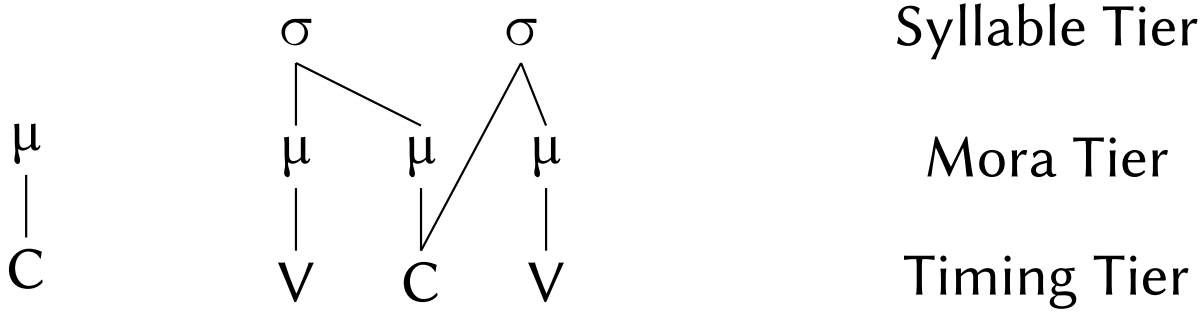
Introduction

Geminate representations (Ringen and Vago, 2011, 156)

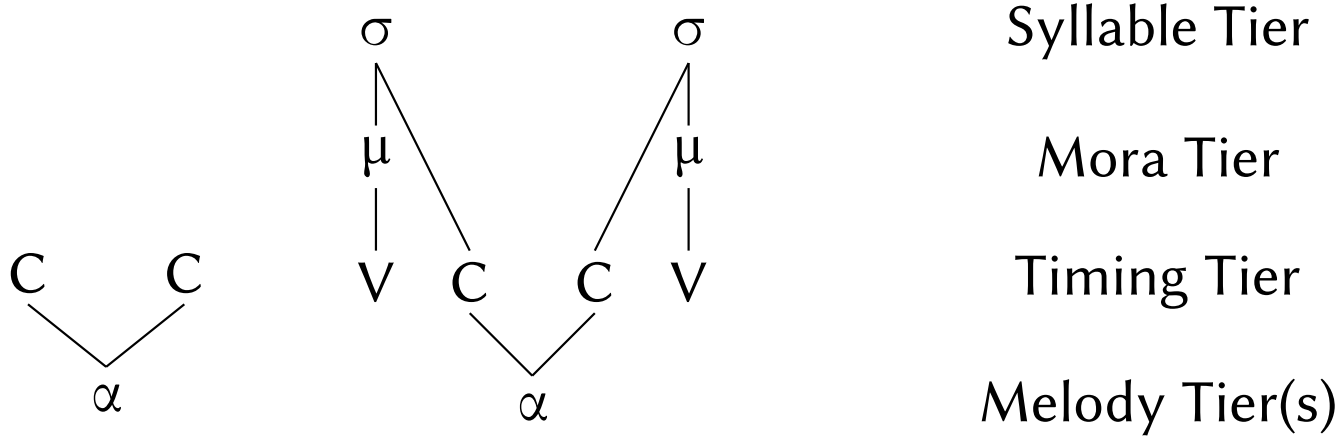
(1) a. *The syllabic weight analysis of geminates*

Underlying *Intervocalic*



b. *The segmental length analysis of geminates*

Underlying *Intervocalic*



Weight for singleton (C) and geminate (G) codas

(2)

	CVC	CVG
I.	light	light
II.	heavy	heavy
III.	light	heavy
IV.	heavy	light

Weight for singleton and geminate codas: Predictions

Predicted under the 'length' theory:

(3)

	CVC	CVG
I.	light	light
II.	heavy	heavy
III.	light	heavy
IV.	heavy	light

- weight is a derived property of geminates
- geminates in coda position should always pattern uniformly alongside the singleton codas

➙ **Principle of Equal Weight for Codas** (Tranel, 1991)

Weight for singleton and geminate codas: Predictions

Predicted under the 'weight' theory:

(4)

	CVC	CVG
I.	light	light
II.	heavy	heavy
III.	light	heavy
IV.	heavy	light

- geminates are inherently moraic
- weight is only a derived property of singleton codas

Weight for singleton and geminate codas: Empirical picture

	CVC	CVG	*Example*
I.	light	light	*Selkup (cf. Tranel, 1991)*
II.	heavy	heavy	*Latin (cf. Tranel, 1991)*
III.	light	heavy	*Hausa (cf. Davis, 2011)*
IV.	heavy	light	*Ngalakgan (cf. Baker, 2008)*

Main Claim

- **geminates are underlying moraic** but might not emerge as such on the surface (Davis, 2011)
- formalized through an extension of Containment Theory within OT (Prince and Smolensky, 1993/2004)

→ all four language types in (4) can be predicted

→ also accounts for asymmetries found for edge geminates

→ **bridges the gap between between the segmental and prosodic** accounts of geminates without employing a Composite Model that simultaneously uses x-slots and moras (Curtis, 2003)

Theory: Geminates are moraic

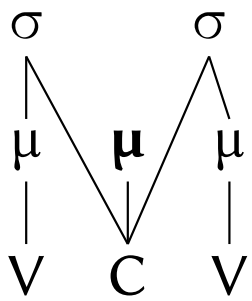
Theoretical background

Assumption: Coloured Containment (van Oostendorp, 2006; Revithiadou, 2007; Trommer, 2011; Zimmermann, 2014; Trommer and Zimmermann, 2014)

(5) *Containment (Prince and Smolensky, 1993/2004)*
Every element of the phonological input representation is contained in the output.

1. **No deletion**: unrealized elements are not integrated under the highest prosodic node (=Stray Erasure, McCarthy, 1979; Steriade, 1982; Itô, 1988)

(6) *Weightless consonant*



→ both syllables are light, the second μ remains phonetically uninterpreted

Assumption: Coloured Containment (van Oostendorp, 2006; Revithiadou, 2007; Trommer, 2011; Zimmermann, 2014; Trommer and Zimmermann, 2014)

2. **No deletion of association lines**: they can only be marked as 'phonetically invisible' (=not interpreted)

(7) *Marking conventions for different types of association lines*

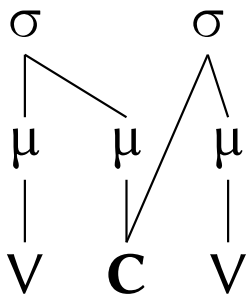
Morphological association lines		Epenthetic association lines	
phonetically visible:	phonetically invisible:	phonetically visible:	phonetically invisible:
a.	b.	c.	d.

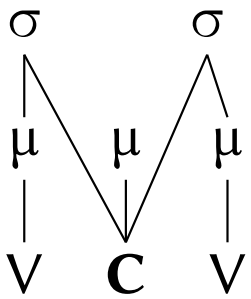
3. All morphemes have a 'colour' (=affiliation); epenthetic elements are colourless (=grey background)

Phonetic interpretation: geminates (to be revised)

(8) *The phonetic interpretation of geminates*
A consonant can be interpreted as phonetically long iff it is **linked to more than one syllable**.

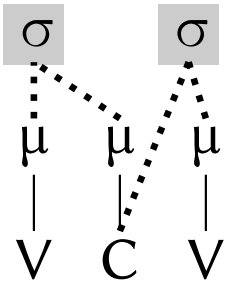
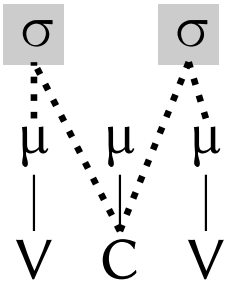
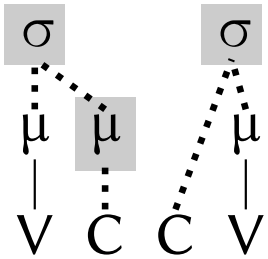
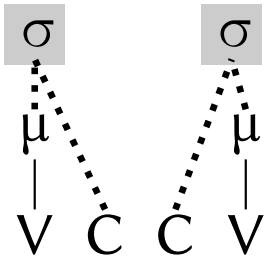
(9) *Possible geminates*

a. 

b. 

Underlyingly (non)moraic consonants and syllable weight

(10)

	…can contribute to syllable weight	**…can be irrelevant for syllable weight**
Geminate: **μ** | **C**	a. 	b. 
Non-geminate: **C**	c. 	d. 

Choice: Contribution to syllable weight?

For geminates (=underlyingly moraic)

Is the underlying μ integrated under a σ node in a phonetically visible way?

For singletons (=underlyingly nonmoraic)

Is a μ assigned to the C and integrated under a σ node in a phonetically visible way?

➙ the (non)moraicity of geminates is not bound to the (non)moraicity of singleton codas

Predicting the four language types

Constraints

(11)

a. ONSET! (=ONS!)

   Assign * for every σ without a phonetically visible onset consonant.

b. WEIGHTBYPOSITION (=WBP)

   Assign * for every coda consonant that is not phonetically dominated by a μ.

c. *C^{μ}

   Assign * for every consonant that is phonetically dominated by a phonetically visible μ.

d. *$_{\sigma}[C^{\mu}$

   Assign * for every consonant that is phonetically visibly dominated by a μ but not in coda position.

e. MAX-μ

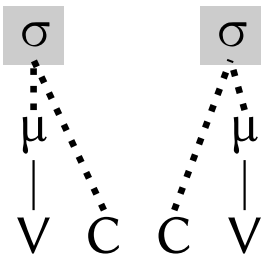
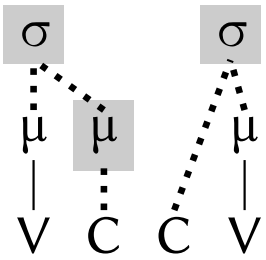
   Assign * for every phonetically invisible μ.

f. DEP-μ

   Assign * mark for every epenthetic μ.

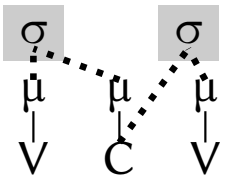
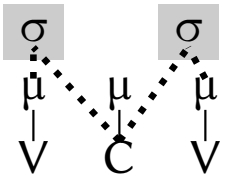
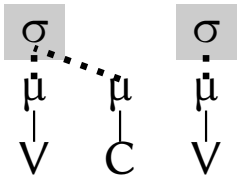
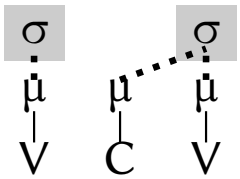
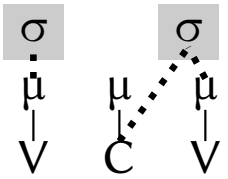
Type I: Selkup

(12) *CVC=light*

μ μ | | V C C V	*σ[C$^{\mu}$	Ons!	*C$^{\mu}$	Dep μ	WBP	Max μ
☞ a. 					*	
b. 			*!	*!		

Type I: Selkup – CVG=light

(13)

μ μ μ V C V	*σ[C$^{\mu}$	Ons!	*C$^{\mu}$	Dep μ	WBP	Max μ
a. 			*!			
☞ b. 						*
c. 		*!	*!			
d. 	*!		*!			
e. 	*!					*

Type II: Latin

(14)

	*σ[Cμ	Ons!	WBP	Dep μ	Max μ	*Cμ
Vμ C C Vμ	i. CVC=heavy					
a. Vμ C.C Vμ			*!			
☞ b. Vμ Cμ.C Vμ				*		*
Vμ Cμ Vμ	ii. CVG=heavy					
☞ a. Vμ Cμ Vμ						*
b. Vμ C(μ) Vμ					*!	
c. Vμ Cμ.V μ		*!				*
d. Vμ.C μ Vμ	*!					*

Type III: Hausa

(15)

	*σ[Cμ	Ons!	Dep μ	WBP	Max μ	*Cμ
Vμ.CCVμ	i. CVC=light					
☞ a. Vμ.Cμ.CVμ				*		
b. Vμ.Cμ.Cμ.Vμ			*!			*
Vμ.CμVμ	ii. CVG=heavy					
☞ a. Vμ.CμVμ						*
b. Vμ.C(μ)Vμ					*!	
c. Vμ.Cμ.Vμ		*!				*
d. Vμ.Cμ.Vμ	*!					*

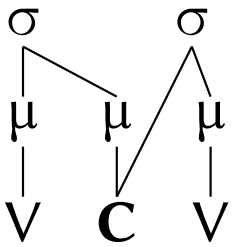
Type IV: Ngalakan

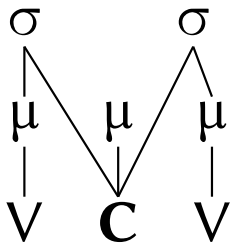
(16)

	*σ[Cμ	Ons!	WBP	*Cμ	Dep μ	Max μ
Vμ CCVμ	i. CVC=heavy					
a. Vμ C.CVμ			*!			
☞ b. Vμ Cμ.CVμ				*	*	
Vμ Cμ Vμ	ii. CVG=light					
a. Vμ Cμ Vμ				*!		
☞ b. Vμ C(μ) Vμ						*
c. Vμ Cμ.Vμ		*!		*		
d. Vμ.Cμ Vμ	*!			*		

Geminate vs. Non-geminate

- so far: underlying moraic consonants surface as weight-contributing (17-a) or as non-weight-contributing (17-b)

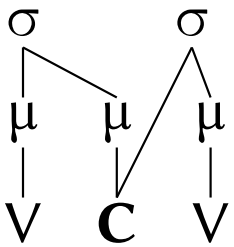
(17) a. 

b. 

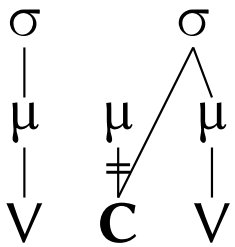
- also possible: **neutralization of geminates to singletons**

→ the underlying association line to the μ is marked as phonetically invisible (18-b): the C is not doubly linked anymore

(18) *Geminate*

a. 

Short consonant

b. 

Neutralization of a geminate to a singleton: constraints

(19) a. MAX(μ—S)

Assign * for every phonetically invisible association line between a μ and a segment.

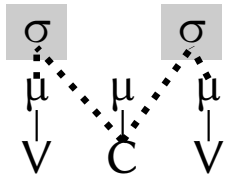
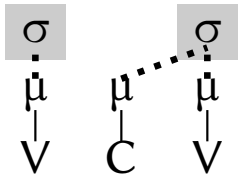
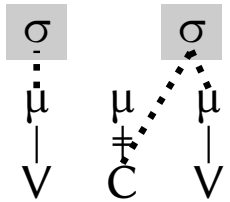
b. ONERT

Assign * for every segment phonetically visibly dominated by more than one root node.

(=prosodic nodes not dominated by another prosodic node)

Neutralization of a geminate to a singleton: tableau

(20)

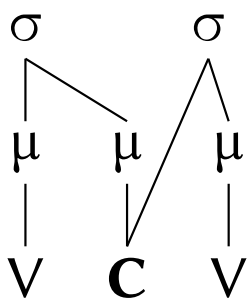
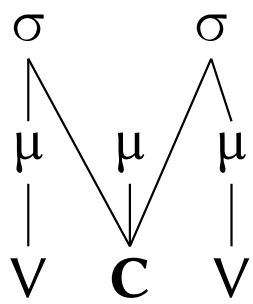
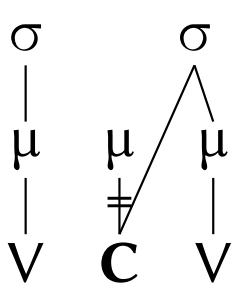
μ μ μ V C V	One Rt	*σ[C^μ	Max μ—S
a.  [VC:V]	*!		
b.  [V.C:V]		*!	
☞ c.  [V.CV]			*

➙ *$_{\sigma}$[C$^{\mu}$ does not enforce ambisyllabicity anymore:
a language without intervocalic geminates

(the structure (20-c) is abbreviated VC$^{((\mu))}$V in the following)

Underlying geminates: predicted surface forms

(21)

			
abbreviation:	$VC^{\mu}V$	$VC^{(\mu)}V$	$VC^{((\mu))}V$
interpreted as:	C:	C:	C
contributes to σ weight:	yes	no	no
violates:	$^{*}C^{\mu}$	OneRt, Max-μ	Max(μ—S), Max-μ

Initial geminates

Edge geminates

- so far: intervocalic geminates (=by far the most common crosslinguistically)
- geminates at word edges are far less frequent, but existent
  (Thurgood, 1993; Muller, 2001; Davis, 2011; Dimitrieva, 2012; Topintzi and Davis, to appear)

→ proposed model easily extends to cases where the question of whether geminates contribute to syllable weight depends on their position

Phonetic interpretation: geminates, revisited

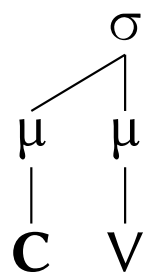
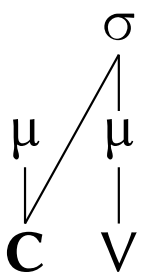
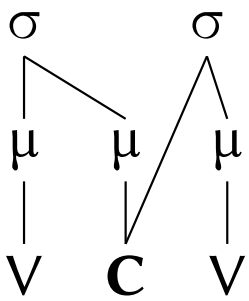
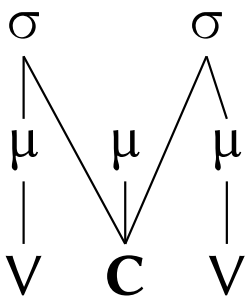
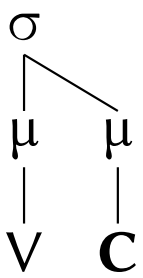
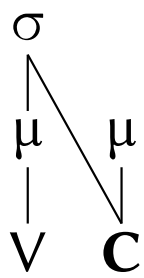
(22) *The phonetic interpretation of geminates*

A consonant can be interpreted as phonetically long iff

a. it is **linked to more than one syllable** or

b. it is phonetically visibly linked to an **μ at the word-edge**.

(23) *Possible geminates*

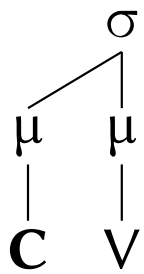
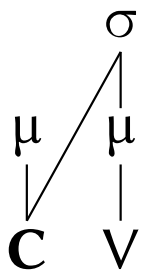
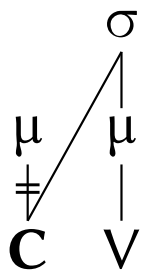
Initial geminates (cf. Kiparsky (2003))		Medial geminates		Final geminates	
a.	b.	c.	d.	e.	f.
					

Initial geminates: Possible outcomes

(24) $^{*}{}_{\omega}[C^{\mu}$

Assign * for every word-initial consonant that is phonetically dominated by a phonetically visible μ.

(25)

abbreviation:	 $C^{\mu}V$	 $C^{(\mu)}V$	 $C^{((\mu))}V$
interpreted as:	C:	C:	C
contributes to σ weight:	yes	no	no
violates:	$^{*}C^{\mu}$ $^{*}{}_{\omega}[C^{\mu}$	OneRt, Max-μ	Max(μ—S), Max-μ

Trukese (Hart, 1991; Davis and Torretta, 1998; Davis, 1999*b*)

- all consonants in Trukese except the glides may surface as geminates
- geminates are possible initially and medially and contribute weight (Nouns must be C:V, CV:, or bisyllabic, but CV or CVC nouns are generally impossible)

→ **Initial and medial geminates contribute to syllable weight**

Trukese: tableaux

(26) *Trukese: Initial moraic geminates*

	Ons!	Max μ–S	Dep μ	Max μ	*σ[Cμ	*Cμ	WBP	One Rt
Vμ CCVμ	i. CVC=light							
☞ a. Vμ C.CVμ							*	
b. Vμ Cμ.CVμ			*!			*		
Vμ Cμ Vμ	ii. CVG=heavy							
☞ a. Vμ Cμ Vμ						*		
b. Vμ C(μ) Vμ				*!				*
c. Vμ Cμ.Vμ	*!					*		
d. Vμ.Cμ Vμ					*!	*		
Cμ V	iii. GV=heavy							
☞ a. Cμ V					*	*		
b. C(μ) V				*!	*			*
c. C((μ)) V		*!		*				

Thurgovian Swiss (Muller, 2001; Kraehenmann, 2001, 2003)

- geminates in all positions
- words must be bimoraic: vowel lengthening for CVC (27-a)
  (=final codas are extrametrical)
- no vowel lengthening for CVG (27-b) but for GVC (27-c)

→ **No weight-contribution for initial geminates but for medial and final ones**

(27) *Word minimality in Thurgovian Swiss (Muller, 2001, 101)*

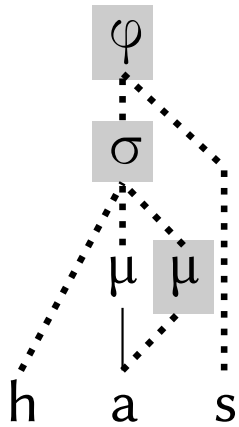
	Root	Singular	Plural	
a.	/has/	haːs	hase	'hare'
b.	/fɛtː/	fɛtː	fɛtːe	'fat'
c.	/tːak/	tːaːk	tːake	'day'

Word minimality and vowel lengthening in Thurgovian Swiss

(28)

final singleton

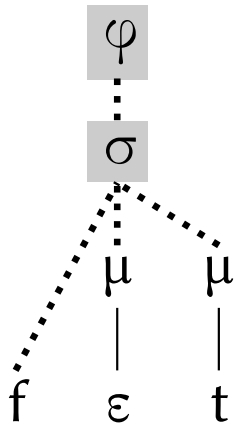
a.



/has/ → [haːs]

final geminate

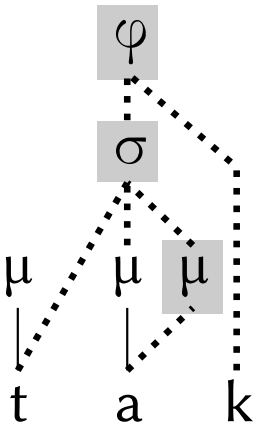
b.



/fɛtː/ → [fɛtː]

initial geminate

c.



/tːak/ → [tːaːk]

Thurgovian Swiss: tableaux

(29) *Thurgovian Swiss: Type II with non-moraic initial geminates*

	Ons!	Max μ–S	WBP	*ω[Cμ	*σ[Cμ	Dep μ	Max μ	One Rt	*Cμ
$V^{\mu}CCV^{\mu}$	i. CVC=heavy								
a. $V^{\mu}C.CV^{\mu}$			*!						
☞ b. $V^{\mu}C^{\mu}.CV^{\mu}$						*			*
$V^{\mu}C^{\mu}V^{\mu}$	ii. CVG=heavy								
☞ a. $V^{\mu}C^{\mu}V^{\mu}$									*
b. $V^{\mu}C^{(\mu)}V^{\mu}$							*!	*	
c. $V^{\mu}C^{\mu}.V^{\mu}$	*!								*
d. $V^{\mu}.C^{\mu}V^{\mu}$					*!				*
$C^{\mu}V$	iii. GV=light, geminate								
a. $C^{\mu}V$				*!	*				*
☞ b. $C^{(\mu)}V$					*		*	*	
c. $C^{((\mu))}V$		*!					*		

Hausa, revisited

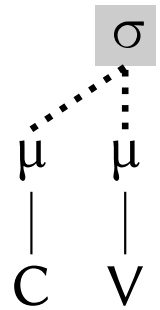
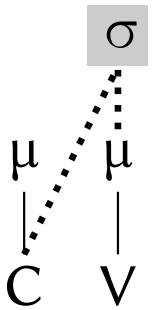
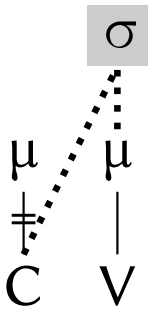
- Hausa has intervocalic geminates but no initial geminates
- intervocalic geminates contribute to σ weight: Max-μ ≫ *C^{μ}
- initial moraic consonants are neutralized to short consonants: *$_{\sigma}[C^{\mu}$ ≫ Max-μ, Max(μ—S)

(30) *Hausa: type III without initial geminates*

	*$_{\sigma}[C^{\mu}$	Ons!	Dep μ	*$_{\omega}[C^{\mu}$	One Rt	Max μ—S	WBP	Max μ	*C^{μ}
$C^{\mu}V^{\mu}$	iii. GV=light, no geminate								
a. $C^{\mu}V$	*!								*
b. $C^{(\mu)}V$	*!							*	
☞ c. $C^{((\mu))}$						*			

Summary: Initial moraic consonants

(31)

	Trukese	Th. Swiss	Hausa
	a. 	b. 	c. 
interpreted as:	[C:V]	[C:V]	[CV]
contributes to syllable weight:	yes	no	no

Summary

Factorial typology (run through OTHelp; cf.Staubs et al. (2010))

(32)

Input:		SinglC VCCV	InitG $C^{\mu}V$		MedG $VC^{\mu}V$		Example
Lgs:	1	W	G	W	G	W	
	2	nW	G	W	G	W	Trukese
	3	W	G	nW	G	W	Th. Swiss
	4	nW	G	nW	G	W	
	5	W	nG	nW	G	W	Latin
	6	nW	nG	nW	G	W	Hausa
	7	W	G	W	G	nW	
	8	nW	G	W	G	nW	
	9	W	G	nW	G	nW	
	10	nW	G	nW	G	nW	
	11	W	nG	nW	G	nW	Ngalakan
	12	nW	nG	nW	G	nW	Selkup
	13	W	G	W	nG	nW	
	14	nW	G	W	nG	nW	Pattani Malay
	15	W	nG	nW	nG	nW	Sentani
	16	nW	nG	nW	nG	nW	Pintupi

G =Geminate
nG =no Geminate
W =contributes weight
nW =no weight

Constraints: Ons!, WbP, $*C^{\mu}$, $*_{\sigma}[C^{\mu}$, $*_{\omega}[C^{\mu}$, OneRt, Dep-μ, Max-μ, Max-μ_{Init}, Max(μ—S)

Summary

- what sets geminates apart from singletons is their **underlying moraicity** (Hayes, 1989; Davis, 1994, 1999*a*, 2003; Topintzi, 2008, 2010)
- for weightless geminates: μ is not integrated into prosodic structure; hence remains unrealized (cf. Davis, 2011)
- a containment-based system allows a three-way outcome for underlying moraic consonants:
  1. **long and weightful**
  2. **long and weightless**
  3. **short and weightless**
- positional asymmetries follow as well (e.g. geminates in all positions, but only medial and final ones are weightful; initial ones are not as in Th. Swiss)

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