

# The place hierarchy is still alive

## Evidence from Lakota

*Ludger Paschen (Leipzig)*

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# The hierarchy

(1) *Universal place hierarchy:*

$\text{COR} \prec \{\text{DOR}, \text{LAB}\}$

(Avery and Rice 1989; Prince and Smolensky 1993; Kang 2000; Lombardi 2002; Hirayama 2005; de Lacy 2006 etc.)

(2) *Place hierarchy for Lakota:*

$\text{COR} \prec \text{DOR} \prec \text{LAB}$

# Different hierarchies / no hierarchies

- Glottals are the most unmarked (de Lacy, 2006; Lombardi, 2002)
- Labials are not the most marked (Hume, 2003)
- Coronals are not the most unmarked (Blevins, 2009)
- Features are language-dependent (Mielke, 2008)
- Featural markedness is language-dependent / markedness does not exist (Hume 2003; Blevins 2004; Samuels and Vaux, this workshop)

# Criteria for markedness

- Frequency (Hirayama, 2005)
- Presence/absence in inventory (Blevins, 2009; Prince and Smolensky, 1993)
- More resistant to modification (Avery and Rice, 1989; de Lacy, 2006; Kang, 2000)
- Transparency in non-local processes
- Less costly for insertion (Lombardi, 2002; Żygis, 2010)

## Lakota follows the PH in (2):

When insertion of a place feature is required,

insert COR if possible,

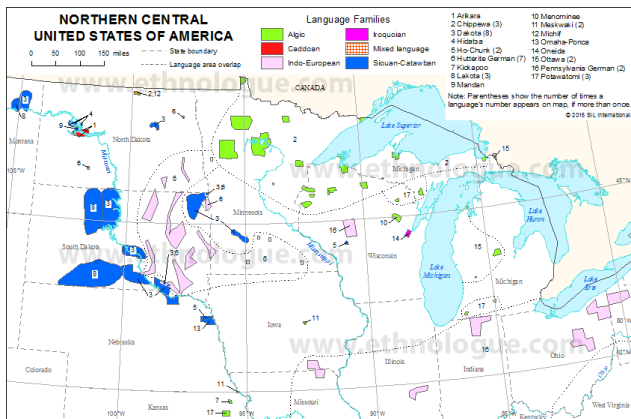
otherwise insert DOR.

- COR emerges in vowel mutation (ablaut)
  - Additional evidence: Mutated vowels are exceptional palatalization triggers
- DOR emerges when coronals are disallowed for independent (phontactic) reasons

# Lakota in the Siouan family

## Siouan

- Mississippi Valley
  - Dakotan
    - Lakota (= Lakhótiyapi = Teton = Thítŋuŋwaŋ)



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# Lakota vowel inventory

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i ï	u ï
e	o
a ã	

(Shaw, 1980; Ullrich, 2011)



# Lakota consonant inventory

LAB	COR		DOR	LAR
p p'	t t'	tʃ tʃ'	k k'	(ʔ)
p <sup>h</sup> (b)	t <sup>h</sup>	tʃ <sup>h</sup>	k <sup>h</sup>	
	s s'	ʃ ʃ'	x x'	h
	z	ʒ	ʁ	
	l			
m	n			
w		j		

(Shaw, 1980; Ullrich, 2011)

# Theoretical Assumptions

- A unitary set of place features for Cs and Vs (Clements and Hume, 1995; Lahiri and Evers, 1991)
- The low vowels /a, ã/ do not contrast for place and therefore lack a place feature

	COR	∅	LAB
[+h][-l]	i ã		u ã
[-h][-l]	e		o
[-h][+l]		a ã	

# Theoretical Assumptions

- Optimality Theory (Prince and Smolensky, 1993)
- The PH in (2) as ranked DEP(F) constraints:

(3) DEP(LAB)  $\gg$  DEP(DOR)  $\gg$  DEP(COR)

- Colored Containment (Trommer, 2011; van Oostendorp, 2006):

- (4) The input is properly contained in the output, with no losses.
- (5) Phonological material belonging to the same morpheme has the same color, while phonological material with no morphological affiliation does not have a color.
- (6) Adding an association line between a colored and a colorless node does not incur a violation of DEPLINE.

# Vowel mutation: Data

- Vowel mutation (*ablaut*) raises the low vowels /a, ã/ to /e/
- Mutation is triggered only by a certain sub-set of suffixes and affects only a certain sub-set of stems
- Mutation applies only when a trigger suffix is affixed to an undergoer stem:

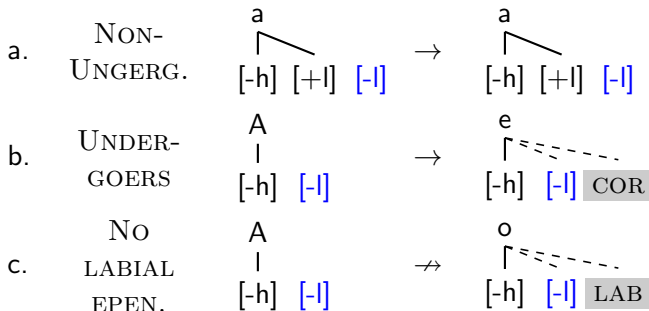
		NON-TRIGGER		TRIGGER	
		'PL'		'NEG'	
NON-UND.	nija	nija-pi	nija-fni	'breathe'	
UNDERG.	ap <sup>h</sup> a	ap <sup>h</sup> a-pi	<b>ap<sup>h</sup>e-fni</b>	'strike'	

# Vowel mutation: Analysis

- Trigger suffixes: floating [-low]
- Undergoer stems: final vowel /A/ underspecified for [low]
- Non-undergoer stems: MAXLINE protects lines to [low] features (no overwriting)
- HAVEPLACE/[-l]: Non-low Vs must have a place feature


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# Vowel mutation: Analysis

- Successful V-mutation with a trigger suffix:  
Emergence of COR

	V ↑ [-l]	HP/[-l]	DEP LAB	DEP DOR	DEP COR
ap <sup>h</sup> A + [-l] fni					
a. ap <sup>h</sup> Afni	*!				
 b. ap <sup>h</sup> efni					*
c. ap <sup>h</sup> ofni			*!		

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# Vowel mutation: Analysis

- No mutation in the absence of a trigger suffix:  
Default [+l] insertion

(7) HH: Each vowel must have a full height specification.

ap <sup>h</sup> A + pi	V ↑ [-l]	HP/[-l]	HH	DEP COR	DEP [+l]	DEP [-l]
a. ap <sup>h</sup> Api			*!			
 b. ap <sup>h</sup> api					*	
c. ap <sup>h</sup> epi				*!		*

- Palatalization changes a velar stop into a coronal affricate after /i/

ma-	<b>k<sup>h</sup></b> ute	1SG.O-shoot	'he shoots at me'
ni-	<b>tʃ<sup>h</sup></b> ute	2SG.O-shoot	'he shoots at you'
wa-	<b>ka</b> hĩta	1SG.S-sweep	'I sweep'
i-	<b>tʃa</b> hĩte	INS-sweep	'broom'

- Underlying mid vowels do not trigger palatalization

we-	<b>kĩ</b>	blood-DEF	'the blood'
x'e-	<b>ka</b>	rough-QUAL	'it is rather rough'

- Mid vowels derived from ablaut do trigger palatalization

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sapA	<b>kĩ</b>		
sape-	<b>tʃĩ</b>	black-DEF	'the black one'

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ijajA	<b>k'eʃ</b>		
ijaje-	<b>tʃ'eʃ</b>	go-CNTF.OPT	'if only he had gone'

---

- The trigger suffixes *-kĩ* and *-k'eʃ* act as ablaut triggers and targets for palatalization at the same time

Data from Shaw (1980). Ullrich (2011) notes that contemporary Lakota speakers no longer accept palatalization after mutated vowels.

(8) \*ikV: Assign one \* for every pronounced [ikV] sequence (McCarthy, 2007, p. 25).

- \*ikV is repaired by spreading of COR from the high vowel to the velar:



(9) \*ekV: Assign one \* for every pronounced [ekV] sequence.

- \*ekV is not repaired because it is outranked by DEPLINE:

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b. NO PALATA-                    e    k    V                    e    k    V  
       LIZATION                    |    |                    |    |  
   C O R D O R                    →                    C O R D O R

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# Palatalization: Analysis

(10) \*ekV: Assign one \* for every pronounced [ekV] sequence.

- Derived mid vowels can be repaired to satisfy \*ekV without violating DEP<sub>LINE</sub>:

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	PALATALI-	e	k	V			e	tʃ	V
c.	ZATION BY				→			- - -	≠
	DERIVED [e]	COR	DOR				COR	DOR	

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# Palatalization: Analysis

- Successful palatalization after /i/


	ni + k <sup>h</sup> ute	* <u>ik</u> V	DEP LINE	* <u>ek</u> V	MAX LINE
	a. nik <sup>h</sup> ute	*!			
☞	b. nit <sup>h</sup> ute		*		*

- No palatalization after underlying /e/

	we + kĩ	* <u>ik</u> V	DEP LINE	* <u>ek</u> V	MAX LINE
☞	a. wekĩ			*	
	b. wetĩ		*!		*

# Palatalization: Analysis

- Exceptional palatalization after derived [e]

	ijajA + k'ej	* <u>ik</u> V	DEP LINE	* <u>ek</u> V	MAX LINE
a.	ijajek'ej			*!	
 b.	ijajetj'ej				*

- Adding an association line between a colored and a colorless node does not incur a violation of DEP<sub>LINE</sub> according to basic principles of Colored Containment (cf. (6))



- Lakota has a phonotactic restriction barring sequences of T+S, where T stands for a coronal non-continuant (such as tʃ, t, l, n) and S stands for any coronal consonant
- Illicit TS sequences are repaired by changing T into [k]
- Dissimilation is most clearly observed in (but not limited to) reduplication:

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sut-a	suk-sut-a	(*sut-sut-a)	'be firm'
t <sup>h</sup> etʃ-a	t <sup>h</sup> ek-t <sup>h</sup> etʃ-a	(*t <sup>h</sup> etʃ-t <sup>h</sup> etʃ-a)	'be new'

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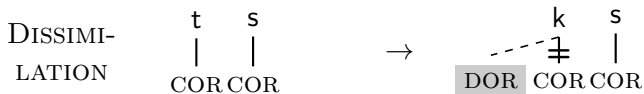
- No dissimilation with other COR+COR sequences, e.g. *oíftablezja* 'having sharp vision', *mast<sup>h</sup>efkik<sup>h</sup>ã* 'metal buttons'

- Dissimilation is delinking of all place and manner features from T and insertion of the least marked features, viz. [-c(ont)] and DOR, according to the place hierarchy
- The constraint ranking reflecting the markedness hierarchy correctly predicts that dorsal *k*, and not bilabial *p*, surfaces instead of the illicit coronal *t*.
- Deletion is not a viable repair option due to high-ranked MAXSEG
- The consonant in the onset is protected by positional faithfulness (IDONS)

# Dissimilation: Analysis

(11) \*TS: Assign one \* for every pronounced sequence of  $C_1C_2$ , where  $C_1$  is a coronal stop and  $C_2$  is a coronal consonant.

- Dissimilation by **DOR** insertion:



- Optimal **DOR** insertion when COR is blocked

	$\mu$ + sut-a	MAX SEG	ID ONS	* <u>TS</u>	DEP LAB	DEP DOR	DEP COR
	a. sut-sut-a			*!			
☞	b. suk-sut-a					*	
	c. sup-sut-a				*!		
	d. sut-xut-a		*!			*	
	e. su- kut-a	*!					

# Is the analysis of Lakota mutation generalizable?

**When a raising process targets a low vowel /a/ that does not contrast for place, the outcome is more likely to be a front unrounded (coronal) than a back (dorsal/labial) vowel.**

**This follows from a) the need for place specification imposed by the grammar and b) insertion of a coronal place feature being generally less costly than insertion of any other place feature.**

# The case of Kulina

- A low vowel /a/ is raised to [e] (or [i] in the case of some roots) before certain suffixes

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<i>o-</i>	<i>k<sup>h</sup>e-</i>	<i>na-</i>	<i>na</i>
/o-	k <sup>h</sup> a-	na-	na/
1SG-	move.SG-	out-	IFUT

'I am going to walk out of the house.'

---

(Dienst, 2014)

⇒ Mutation triggered by [-l] and COR insertion

# The case of Gaagudju

- Many verbal paradigms display vowel gradation:

u	~	o:
i	~	e:
a	~	e:

(Harvey, 2002)

⇒ Mutation triggered by  $\mu$  and [-l][-h] (height overwriting);  
 COR insertion in the case of /a/

# The case of Slave

- Many verbal paradigms display vowel gradation:

e	~	i
o	~	u
a	~	e, e:, i

(Rice, 1989)

⇒ Mutation triggered by [+h];  
 COR insertion in the case of /a/



# The case of Mauwake

- The past tense allomorph {-E} is realized as [o] after a labial segment and as [e] elsewhere:

mu- <b>o</b> -k	'(s)he swallowed'	waki- <b>e</b> -k	'(s)he fell down'
aaw- <b>o</b> -k	'(s)he got it'	solon- <b>e</b> -k	'it glided'
ekap- <b>o</b> -k	'(s)he came'	serak- <b>e</b> -k	'(s)he wiped'

(Berghäll, 2015)

⇒ {-E} is underspecified for place, repair by spreading of LAB if possible, otherwise insertion of **COR**

- Mutation, palatalization and dissimilation in Lakota are in line with the Universal Place Hierarchy
- **COR** insertion is less costly than insertion of other place features in Lakota, and possibly in a number of other languages as well
- Broader empirical basis needed to understand whether there really are global tendencies with respect to place insertion in vowels, and how to treat them synchronically

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# More C changes in Lakota

Dissimilation (a.), voice assimilation (b.), pre-boundary lenition (c.-f.), final devoicing (g.-h.)

a.	ʃítʃA	ʃikʃítʃa	'the things are bad'
b.	káyA	kaxʃí	'she told him to make it'
c.	waf'ákA	waf'ág-itʃ'ija	'to make oneself strong'
d.	ksápA	ksab-itʃ'ila	'to consider oneself smart'
e.	p <sup>h</sup> étA	p <sup>h</sup> el-ókʃã yākápi	'They sat around the fire'
f.	ʃítʃA	ʃíl ája	'to become bad'
g.	júzA	jús ája	'to lead sb. holding him/her'
h.	owíʒa	owíʃ p <sup>h</sup> ikíja	'to make one's own bed'

(Ullrich, 2011, p. 755)

# More phonotactic repairs in Lakota


- Sequences of velar+velar are generally acceptable
- Sequences of two identical Cs (disregarding phonation) are subject to a more general degemination rule

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a.	kay-a	kax-kay-a	'to make, construct'
b.	k <sup>h</sup> ak-a	k <sup>h</sup> a-k <sup>h</sup> ak-a	'to rattle'

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- Analysis:

	$\mu + k^h ak-a$	$*C_\alpha C_\alpha$	MAX •-DOR	MAX SEG	ID ONS	DEP COR
a.	k <sup>h</sup> ak-k <sup>h</sup> ak-a	*!				
b.	k <sup>h</sup> at-k <sup>h</sup> ak-a		*!			*
 c.	k <sup>h</sup> a-k <sup>h</sup> ak-a			*		