



# Where $r$ you going?

A typology of long-distance  
metathesis of liquids

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# Metathesis

- **Reordering** of elements (segments, features…) (Grammont 1905; Webb 1974; Ultan 1978; Hock 1985; Wanner 1989; Blevins & Garrett 1998, 2004; Hume 2001, 2004; Buckley 2011; Chandlee 2014; Canfield 2016; …)

(1) /ABCDEF/ → [ACBDEF] *local transposition*

e.g. Old English *frosk* > Late West Saxon *froks* 'frog' (Weyhe 1908)

(2) /ABCDEF/ → [ADCBEF] *reciprocal non-local metathesis*

e.g. Latin *mi:rak(u)lum* > Spanish *milagro* 'miracle' (Buckley 2011)

(3) /ABCDEF/ → [AEBCDF] *long-distance metathesis of one element*

e.g. Latin *fenestra* > Calabrian *frinesta* 'window' (Rohlf 1966)

# Long-distance metathesis of liquids

- **LDM typically targets liquids**
  - elongated cues (Ladefoged & Maddieson 1996) that can span even three syllables away
  - perceptual metathesis: “a ‘mistake’ from the point of view of the previous linguistic system. The segment is *reinterpreted as originating in a new position within the elongated span*” (Blevins & Garrett 2004: 128)

# Diachronic LDM of liquids in Romance

- **Gascon** (Dumenil 1987; Blevins & Garrett 1998; Coffman 2013; Canfield 2016)
- **Alguerese Catalan** (Torres-Tamarit et al. 2012; Cabrera-Callís et al. 2010)
- **Judeo-Spanish** (Lipski 1990; Bradley 2006, 2007)
- **Sardinian** (Wagner 1941; Bolognesi 1998; Molinu 1999; Frigeni 2009; Lai 2013, 2015...)
- **Campanian** (Abete 2015); other **Italo-Romance** (Rohlf 1966)
- **Italiot Greek** (Rohlf 1950; Blevins & Garrett 2004; Apostolopoulou 2020, in prep.)



**Aim:** a typological analysis of the LDM languages

# 1. LDM in Romance

# LDM patterns

- In all the languages that display LDM, a liquid (henceforth R) leaves from and lands in a post-consonantal position
- Two patterns:

## 1. LDM to the first syllable

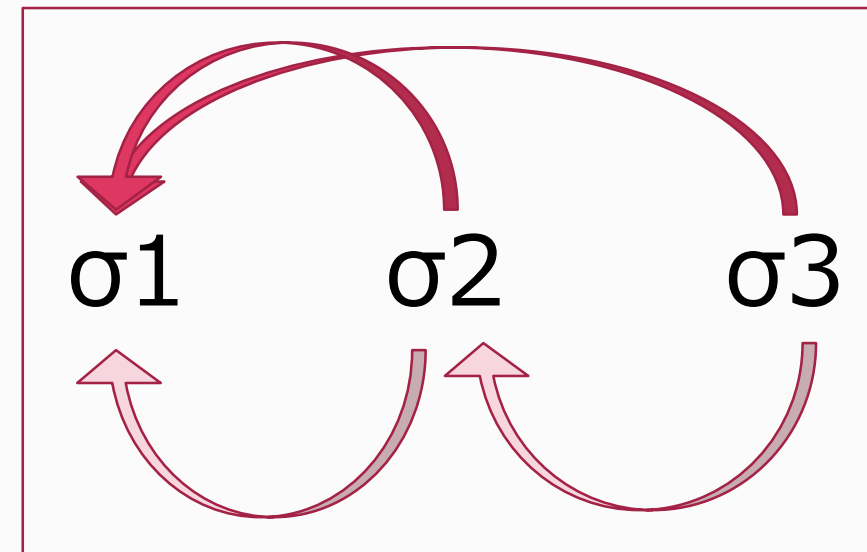
Sardinian (Lai 2013)

- (4) a. cap**R**a > c**R**apa 'goat'  
 b. capist**R**um > c**R**apistu 'halter'

## 2. LDM to the adjacent syllable to the left

Judeo-Spanish (Lipski 1990; Russel-Webb & Bradley 2009)

- (5) a. cap**R**a > c**R**apa 'goat'  
 b. capest**R**o > cab**R**esto 'halter'



# Extra: metathesis from VR

- In a subset of the LDM languages, R moves also from a post-vocalic to a post-consonantal position
- Two patterns:

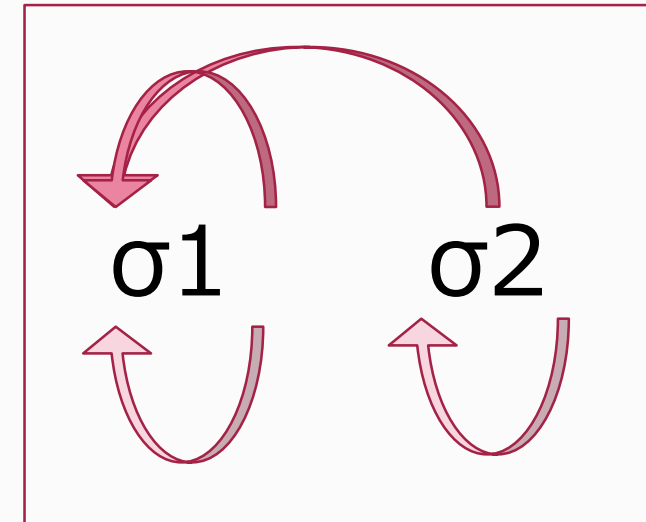
## 1. to the first syllable

Campidanian Sardinian (Frigeni 2009)

- (6) a. po**R**cus > p**R**okku 'pig'  
 b. gove**R**no > g**R**uvennu 'government'

## 2. to the same syllable

- (7) a. fo**R**ment > f**R**oment 'wheat' Alguerese Catalan (Torres-Tamarit et al. 2012)  
 b. tave**R**na > tav**R**ena 'tavern' Judeo-Spanish (Torres-Tamarit et al. 2012)



# Generalizations

## Main phenomenon

- LDM of a R from a non-initial CR configuration
- It forms a CR closer to the left edge

## Different language types on the basis of two criteria

- whether or not codas are affected
- whether or not restrictions with respect to distance are imposed



# LDM typology

Languages	Origin		Distance restrictions
	CR	VR	
<i>A. Latin, Medieval Greek</i>	no	no	-
<i>B. Italiot Greek, Gascon</i>	yes	no	no
<i>C. Sardinian*, Campanian</i>	yes	yes	no
<i>D. Judeo-Spanish, Alguerese</i>	yes	yes	yes

## 2. Previous analyses

# Unbounded LDM along the lines of Alber 2001

- **Alber (2001): Optimality Theory** analysis (Prince & Smolensky 1993) of a synchronic LDM process in Campidanian Sardinian (Bolognesi 1998)

(8) a. az**R**ɔba \***R**azɔba 'farmyard' → s:**R**azɔba 'the farmyard'  
 b. ɛ**r**ba \***R**ɛba 'grass' → kus:**R**ɛba 'that grass'

- Metathesis of R to the stem-initial position when this is possible

## What's the driving force?

- **initial positions enjoy special prominence** (Zoll 1996, 1998; Beckman 1998)
- **accumulation** of segmental material closer to the left edge enhances **perceptual prominence** and **word recognition** (see discussion in Alber 2001; Blevins & Garrett 2004)
- **COINCIDE-ONSET-σ1**: *all output elements must be in the onset of the first syllable*

# Unbounded LDM along the lines of Alber 2001

(9)	/kapistRu/	COINCIDE- ONSET $\sigma$ 1	LINEARITY
	a. kapistRu	apistRu (7) !	
	b. kaRpistu	aRpistu (7) !	*
☞	c. kRapistu	apistu (6)	*

(10)	/poRku/	COINCIDE- ONSET $\sigma$ 1	LINEARITY
	a. poRku	oRku (4) !	
☞	b. pRoku	oku (3)	*

All R move to the first syllable  
(=Language C)

- The reversed ranking blocks metathesis = **Language A**
- No ranking protects codas from moving (=Language B)
- No ranking favors a candidate where metathesis creates a non-initial CR (=Language D)

<i>Alber</i>	Origin		Local
	CR	VR	
<b>A</b>	no	no	-
<b>B</b>	yes	no	no
<b>C</b>	yes	yes	no
<b>D</b>	yes	yes	yes

# Unbounded LDM: Coffman 2013a,b

**OT** analysis of metathesis **from and to C\_V** in Gascon, Sardinian, Italiot Greek along the lines of Alber 2001.

- **Cluster maintenance**: minimization of perceptual invasiveness

\***MAP constraints** in a fixed hierarchy (Zuraw 2007; see also Steriade 2001; Fleischhacker 2005)

➔ \*MAP(VRC, CV) >> \*MAP(CRV, CV)

**Simply put:**

- Some unfaithful correspondence between segment sequences are less perceptually invasive than others
- The unfaithful mapping VRC ↔ CV is worse than the mapping CRV ↔ CV

**Also:** COINCIDE-σ1: *all output segments must be in the first syllable*

# Unbounded LDM: Coffman 2013a,b

(11)	/ka pis tru/	*MAP(VRC, CV)	COINCIDE- $\sigma$ 1	*MAP(CRV, CV)
	a. kapistru		pistru (6) !	
	b. karpistu	*!	pistu (5)	*
	c. kapristu		pistru (6) !	**
☞	d. krapistu		pistu (5)	**

- No ranking favors a candidate where metathesis creates a non-initial CR (=Language D)

Map	Origin		Local
	CR	VR	
A	no	no	-
B	yes	no	no
C	yes	yes	no
D	yes	yes	yes

## Restricted LDM: Torres-Tamarit et al 2012

### Harmonic Serialism account of Alguerese Catalan

- R is banned from CR in the rightmost syllable of the stem and from RC
- R moves **gradually** towards the left and docks on the nearest onset, even if it's not the initial one (**=Language D**)
- **FAITH >> MARK:** no metathesis (**=Language A**)
- **If \*CR/mid >> LINEAR:** all Rs move to onset1 (**=Language C**)

/katedral/	*CR /Right	LINEAR NON-LOC	*RC	LINEAR	*CR /Mid	*CR /Left
a. katedral	*!					
☞ b. katerdal			*	*		
c. katredal		*!		*	*	
d. kratedal		*!		*		*

#### Step 1

/katerdal/	*CR /Right	LINEAR NON-LOC	*RC	LINEAR	*CR /Mid	*CR /Left
a. katedral	*!			*		
b. katerdal			*!			
☞ c. katredal				*	*	
d. kratedal		*!		*		*

#### Step 2

/katredal/	*CR /Right	LINEAR NON-LOC	*RC	LINEAR	*CR /Mid	*CR /Left
a. katedral	*!			*		
b. kartedal			*!	*		
☞ c. katredal					*	
d. kratedal		*!		*		*

#### Step 3

# Restricted LDM: Torres-Tamarit et al 2012

- **Language B** allows RC, so **LINEAR >> \*RC**. However, the gradual metathesis process should end once the R has landed in a RC
- E.g. Medieval Greek pikro > Italiot Greek \*pirko, priko 'bitter'

HS	Origin		Local
	CR	VR	
A	no	no	-
B	yes	no	no
C	yes	yes	no
D	yes	yes	yes

/pikro/		*CR /Right	LINEAR NON-LOC	LINEAR	*RC	*CR /Left
	a. pikro	*!				
☞	b. pirko			*	*	
	c. priko		*!	*		*

Step 1

/pirko/		*CR /Right	LINEAR NON-LOC	LINEAR	*RC	*CR /Left
	a. pikro	*!		*		
💣	b. pirko				*	
☹	c. priko			*!		*

Step 2



# Summary

	Origin		Local	OT a la Alber 2001	*MAP	HS
	CR	VR				
<b>A</b>	no	no	-	✓	✓	✓
<b>B</b>	yes	no	no	X	✓	X
<b>C</b>	yes	yes	no	✓	✓	✓
<b>D</b>	yes	yes	yes	X	X	✓

## 3. Analysis

# Framework

- Optimality Theory (Prince & Smolensky 1993/2004; McCarthy & Prince 1995)
- Typological analysis within Property Theory, PT (Alber & Prince 2015; in prep.; Alber 2015; Alber et al. 2016; Alber & Meneguzzo 2016; Merchant & Krämer 2017; DelBusso 2018)
- **Goal:** to extract the *properties* of the LDM typology
- OTWorkplace (Prince et al. 2017)

# Faithfulness constraints

## Precedence structure

**LINEARITY:** assign a violation if the linear order of the segments in the input gets disrupted in the output (see McCarthy & Prince 1995)

## Locality restrictions

**LOCALITY:** assign a violation if a segment crosses the borders of its local domain; specifically, when it moves farther than *one nucleus* away from its original position

- **Stringency relation:** a violation of LOCALITY entails a violation of LINEARITY, but not vice versa.

# Positional markedness constraints

## Left-edge-prominence effect

**ALIGN(Complex Onset, Left Edge):** assign a violation for each syllable that separates a non-initial complex onset from the left edge (see ALIGN(Complex Segment, Left Edge), Zoll 1998)

## R in coda

**\*R/CODA:** assign a violation for every rhotic syllabified in a coda (Orgun 2001)

# Candidates

The difference between local and non-local patterns becomes evident when:

- **The CR is in the third syllable**
  - unbounded LDM: to the first
  - restricted LDM: to the second
- **The VR is in the second syllable**
  - unbounded metathesis: to the first
  - restricted metathesis: to the second
- The (toy) inputs we will look at here: **/pakatRa/, /pakaRta/**
- The R can be in any position in the output: [pRakata], [paRkata],...

# Optima in A, B, C, D

/pakatRa/	LINEAR	LOCAL	ALIGN	*VR	
pakatRa	0	0	2	0	= A
pRakata	1	1	0	0	= B, C
pakRata	1	0	1	0	= D

/pakaRta/	LINEAR	LOCAL	ALIGN	*VR	
pakaRta	0	0	0	1	= A, B
pRakata	1	1	0	0	= C
pakRata	1	0	1	0	= D

→ All attested languages arise

# The properties of the LDM languages

A typological system is defined by its **properties**

“the **ranking conditions** which are both sufficient and necessary in order to generate every language of the system. (...) [P]roperties have two values (a and b), one the logical opposite of the other. **Free combination of property values generates all languages of the typology**”

(Alber & Prince, in prep.)

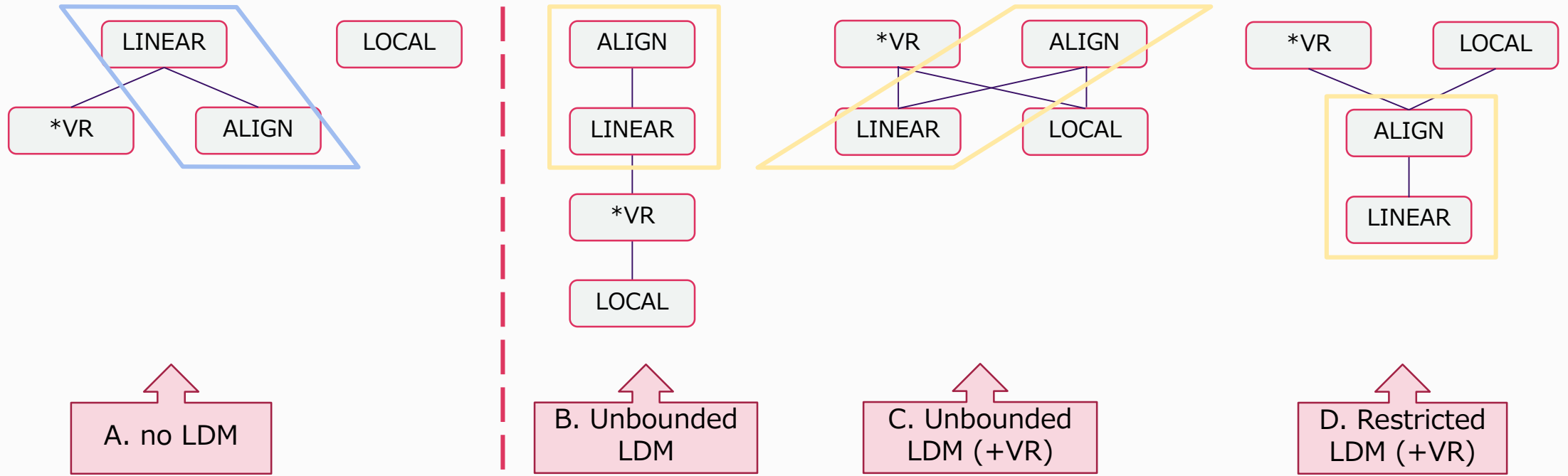
 **Which rankings are crucial for the LDM typology?**



# Properties

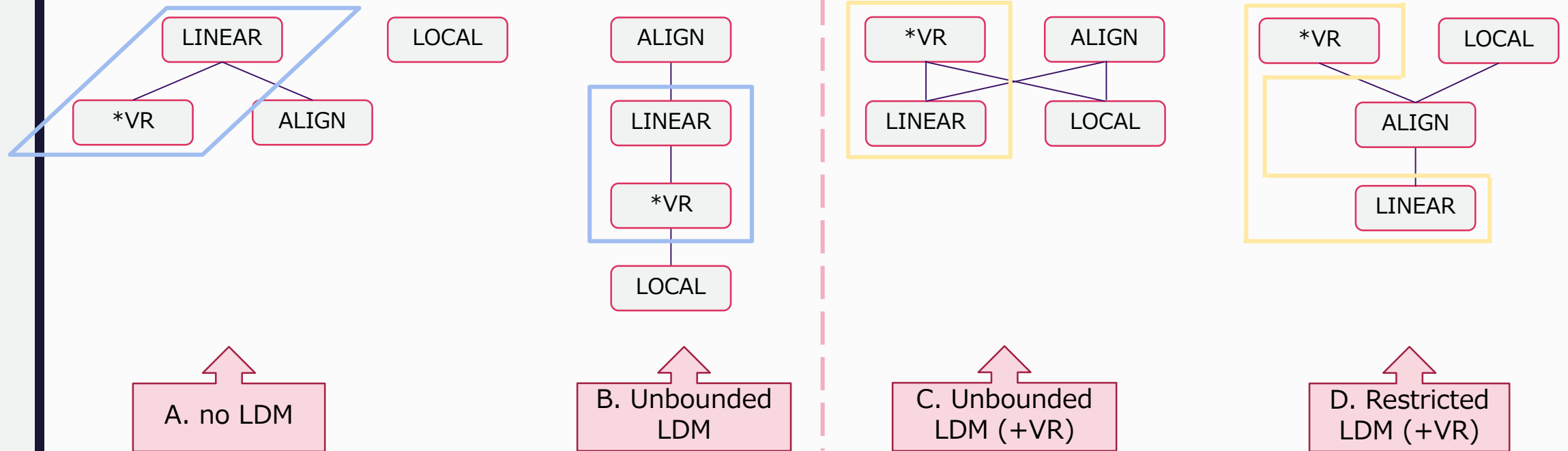
<i>Properties</i>	<i>What they do</i>
ALIGN <> LINEAR	<i>Should R from non-initial CRs move?</i>
*VR <> LINEAR	<i>Should R from VRs move?</i>
{ALIGN, *VR}.sub <> LOCAL	<i>Should metathesis be local?</i>
ALIGN <> *VR	<i>What is worse, non-initial CRs or VRs?</i>

# 1. Is LDM triggered?



- If ALIGN dominates LINEAR, then non-initial CRs are avoided via LDM

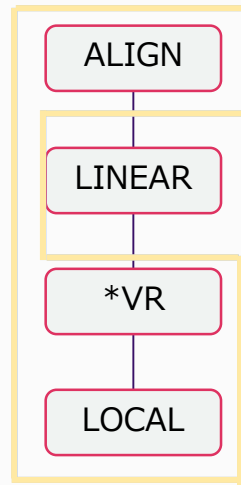
## 2. Does metathesis also target codas?



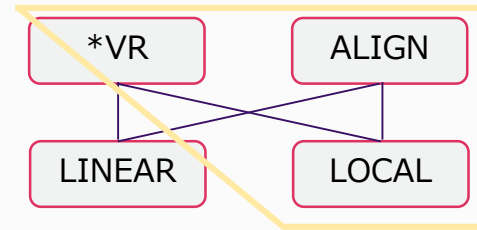
- If \*VR dominates LINEAR, then VRs are avoided via metathesis

### 3. Is locality respected?

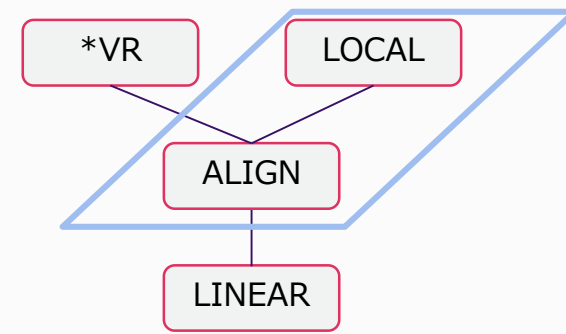
- If both ALIGN and \*VR dominate LOCAL, then metathesis processes may only result in unmarked structures.
- In (B) and (C), metathesizing Rs from CR and/or VR land in the first syllable and create an initial CR, even at the expense of locality.



B. Unbounded  
LDM



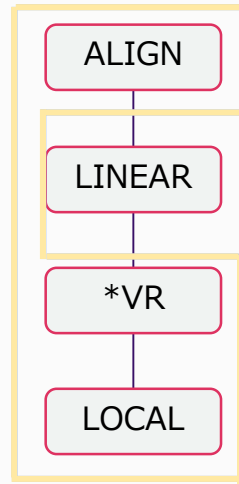
C. Unbounded  
LDM (+VR)



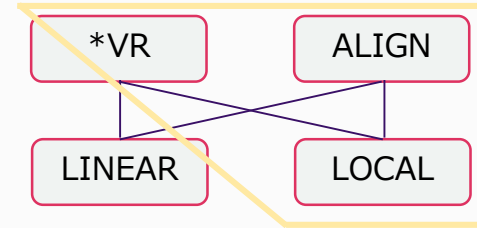
D. Restricted  
LDM (+VR)

### 3. Is locality respected?

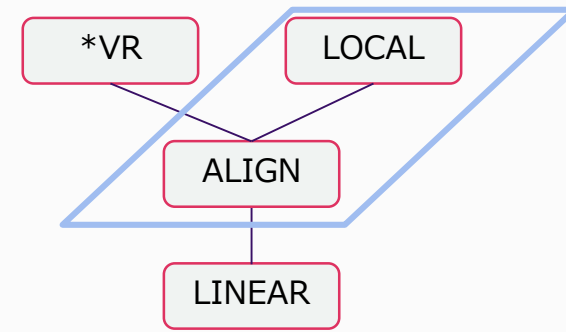
- If LOCAL dominates at least one markedness constraint, the creation of a new marked structure is allowed so that locality restrictions can be obeyed.
- In (D), satisfying LOCAL may give rise to non-initial CRs (violation of ALIGN)



B. Unbounded LDM

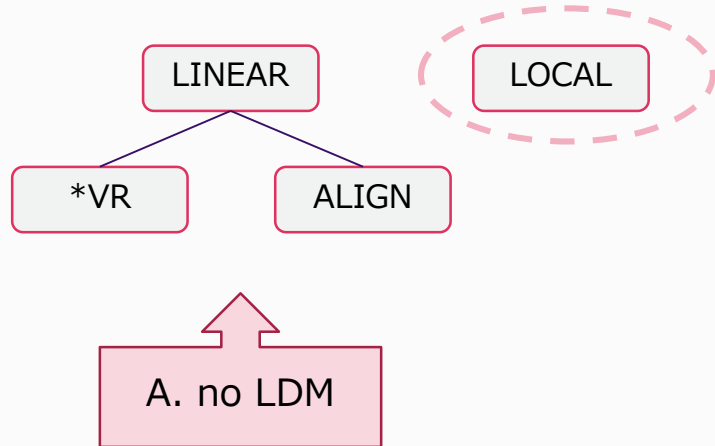


C. Unbounded LDM (+VR)



D. Restricted LDM (+VR)

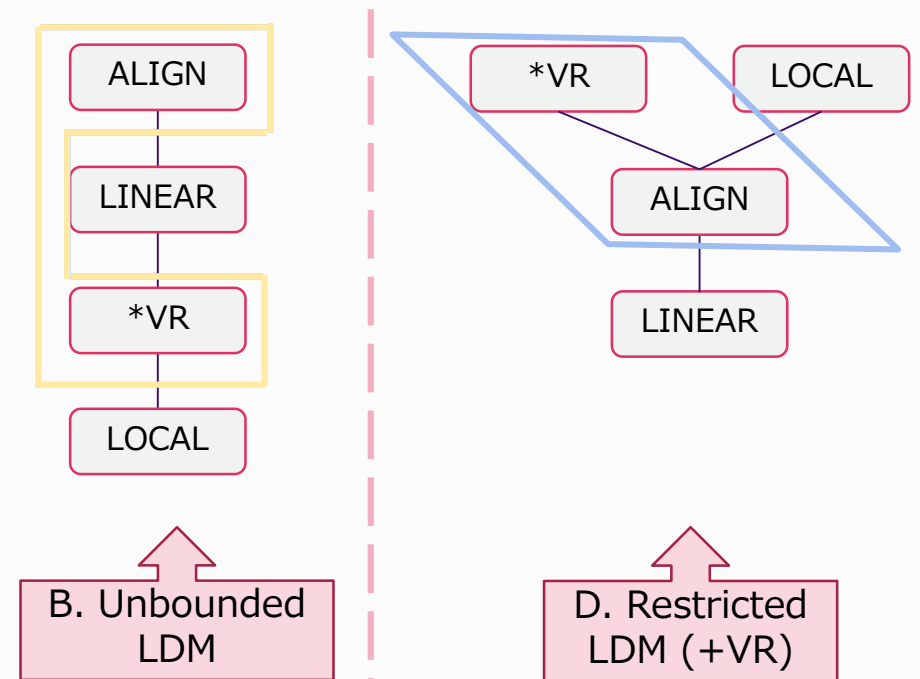
### 3. Is locality respected?



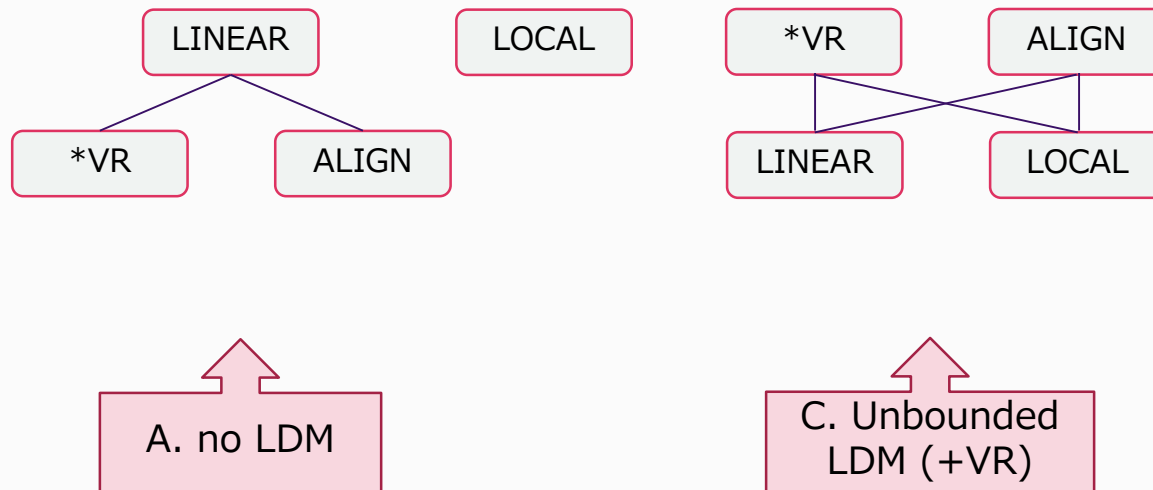
- If LINEAR cannot be violated, then no metathesis will take place
- LOCAL is irrelevant in languages that do not allow metathesis.

## 4. Is it better to have non-initial CR or VR?

- If ALIGN and \*VR are ranked with respect to each other, then one of the relevant marked structures is less tolerated than the other
- The structure that violates the subordinate constraint may be created by metathesis, if this means that higher-ranked constraints are satisfied (as in D)



## 4. Is it better to have non-initial CR or VR?



- If ALIGN and \*VR are not ranked with respect to each other, then
  - both structures are preserved, i.e. realized faithfully, because metathesis is banned altogether (as in A)
  - both structures are prohibited and avoided via unbounded metathesis that results in an unmarked structure, i.e. an initial CR (as in C)



# Summary of property analysis

	ALIGN <> LINEAR	*VR <> LINEAR	{ALIGN, *VR}.sub <> LOCAL	ALIGN <> *VR
A. No LDM	No LDM	No met. VR	<i>moot</i>	<i>moot</i>
B. Unbounded LDM	LDM	No met. VR	Non-Local	No non-initial CR
C. Unbounded LDM (+VR)	LDM	Met. VR	Non-Local	<i>moot</i>
D. Restricted LDM (+VR)	LDM	Met. VR	Local	No VR

Constraint 1 <> Constraint 2

Constraint 1 >> Constraint 2

Constraint 2 >> Constraint 1

## 4. Conclusions

# Conclusions

## Three different LDM languages:

- Unbounded LDM (of non-initial CRs)
- Unbounded LDM with codas participating
- Restricted LDM with codas participating
- PT can accommodate all patterns

	Target		Local	PT
	CR	VR		
<b>A</b>	no	no	-	✓
<b>B</b>	yes	no	no	✓
<b>C</b>	yes	yes	no	✓
<b>D</b>	yes	yes	yes	✓

# Conclusions

**Four crucial rankings determine the typological differences:**

ALIGN <> LINEAR	Metathesis of non-initial CR: yes/no
*VR <> LINEAR	Metathesis of VR: yes/no
{ALIGN, *VR}.sub <> LOCAL	Local metathesis (at the expense of new marked structures): yes/no
ALIGN <> *VR	Avoidance of non-initial CR vs. avoidance of VR

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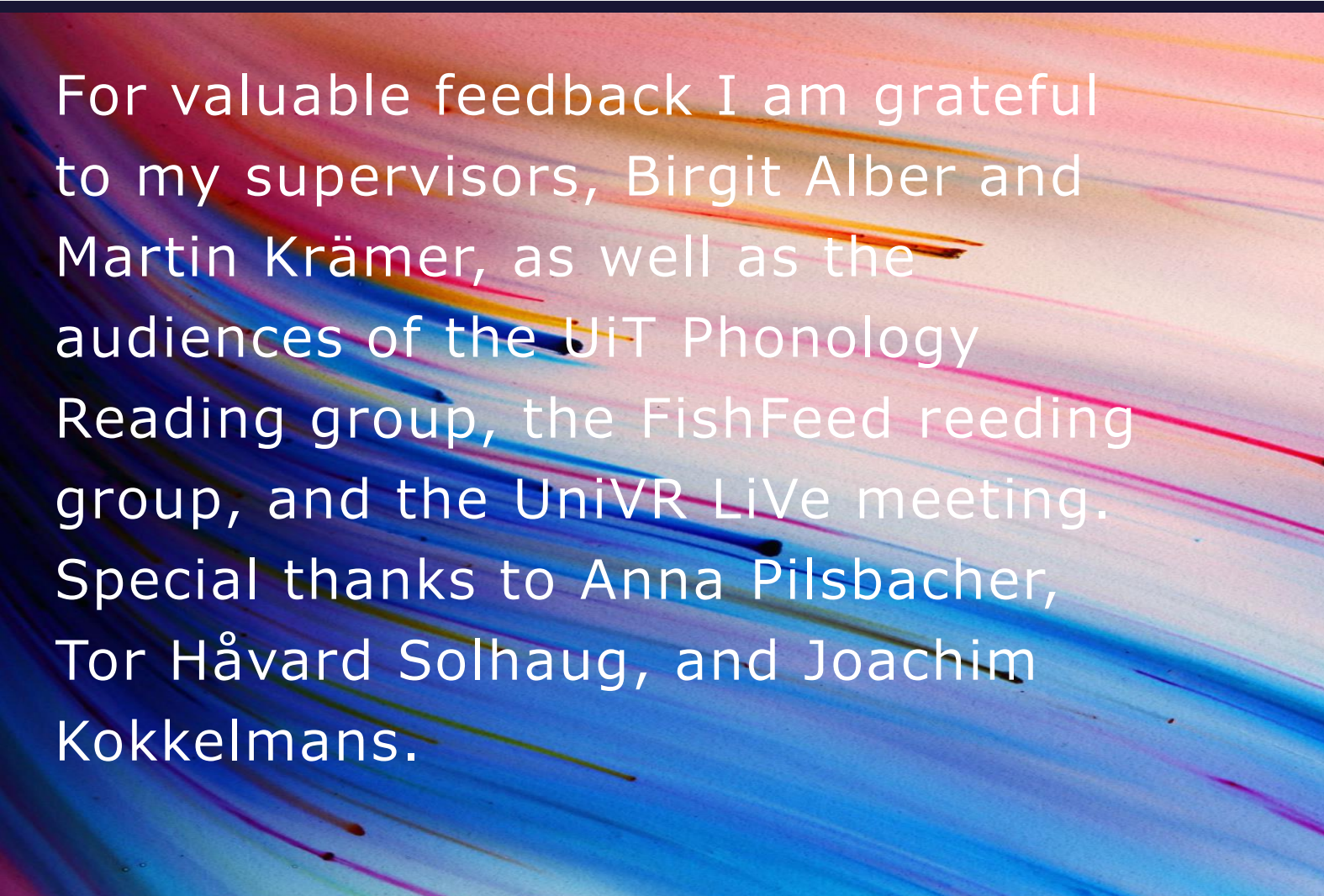
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*And thank you all!*



# Appendix

# Language A: No LDM

/pakatRa/		LINEAR	ALIGN	*VR
	a. pakataR	*!		*
☞	b. pakatRa		**	
	c. pakaRta	*!		*
	d. pakRata	*!	*	
	e. paRkata	*!		*
	f. pRakata	*!		

/pakaRta/		LINEAR	ALIGN	*VR
	a. pakataR	*!		*
	b. pakatRa	*!	**	
☞	c. pakaRta			*
	d. pakRata	*!	*	
	e. paRkata	*!		*
	f. pRakata	*!		

# Language B: Unbounded LDM

/pakatRa/	ALIGN	LINEAR	*VR	LOCAL
a. pakataR				
b. pakatRa	*!*			
c. pakaRta		*	*!	
d. pakRata	*!	*		
e. paRkata		*	*!	
☞ f. pRakata		*		*

/pakaRta/	ALIGN	LINEAR	*VR	LOCAL
a. pakataR				
b. pakatRa	*!*	*		
☞ c. pakaRta			*	
d. pakRata	*!	*		
e. paRkata		*!	*	
f. pRakata		*!		*

# Language C: Unbounded LDM; \*VR

/pakatRa/	*VR	ALIGN	LOCAL	LINEAR
a. pakataR				
b. pakatRa		*!*		
c. pakaRta	*!			*
d. pakRata		*!		*
e. paRkata	*!			*
☞ f. pRakata			*	*

/pakaRta/	*VR	ALIGN	LOCAL	LINEAR
a. pakataR				
b. pakatRa		*!*		*
c. pakaRta	*!			
d. pakRata		*!		*
e. paRkata	*!			*
☞ f. pRakata			*	*

# Language D: Restricted LDM; \*VR

/pakatRa/	*VR	LOCAL	ALIGN	LINEAR
a. pakataR				
b. pakatRa			**!	
c. pakaRta	*!			*
☞ d. pakRata			*	*
e. paRkata	*!			*
f. pRakata		*!		*

/pakaRta/	*VR	LOCAL	ALIGN	LINEAR
a. pakataR				
b. pakatRa			**!	*
c. pakaRta	*!			
☞ d. pakRata			*	*
e. paRkata	*!			*
f. pRakata		*!		*

# Factorial typology

	<b>/pRakata/</b>	<b>/paRkata/</b>	<b>/pakRata/</b>	<b>/pakaRta/</b>	<b>/pakatRa/</b>	
<b>1</b>	pRakata	pRakata	pRakata	pRakata	pRakata	<b>= Unbounded LDM (+VR)</b>
<b>2</b>	pRakata	pRakata	pRakata	pakRata	pakRata	<b>= Restricted LDM (+VR)</b>
<b>3</b>	pRakata	pRakata	pRakata	pakaRta	paRkata ~ pakaRta ~ pakataR	
<b>4</b>	pRakata	pRakata	pakRata	pRakata	pakatRa	
<b>5</b>	pRakata	pRakata	pakRata	pakRata	pakatRa	
<b>6</b>	pRakata	paRkata	pRakata	pakaRta	pRakata	<b>= Unbounded LDM</b>
<b>7</b>	pRakata	paRkata	pRakata	pakaRta	paRkata ~ pakaRta ~ pakataR	
<b>8</b>	pRakata	paRkata	pakRata	pakaRta	pakatRa	<b>= NO LDM</b>

# Property Analysis

	ALIGN <> LINEAR	*VR <> LINEAR	{ALIGN, *VR}.sub <> LOCAL	ALIGN <> *VR
<b>1. all R to first <math>\sigma</math></b>	a	a	a	<i>moot</i>
<b>2. CR to adjacent <math>\sigma</math>; VR to same <math>\sigma</math></b>	a	a	b	b
3. VR1 to first $\sigma$ ; CR2 to first $\sigma$ ; CR3 to VR	a	a	b	a
4. VR to first $\sigma$	b	a	a	b
5. VR to same $\sigma$	b	a	b	b
<b>6. CR to first <math>\sigma</math></b>	a	b	a	a
7. CR2 to first $\sigma$ ; CR3 to VR	a	b	b	a
<b>8. No metathesis</b>	b	b	<i>moot</i>	<i>moot</i>

## Property treeoid

