Tutorial on Paradigms

Jochen Trommer
jtrommer@uni-leipzig.de

University of Leipzig
Institute of Linguistics

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Textbook Paradigms

	sg	pl
Nom	domin**us**	domin**i**
Dat	domin**o**	domin**is**
Acc	domin**um**	domin**os**

	sg	pl
Nom	hort**us**	hort**i**
Dat	hort**o**	hort**is**
Acc	hort**um**	hort**os**

Generalized Paradigm á la Wunderlich & Fabri (1994)

	sg	pl
Nom	-us	-i
Dat	-o	-is
Acc	-um	-os

What is a Paradigm?

A data structure

comprising different inflectional forms (words or affixes)

where each form has a structurally unique position in the structure

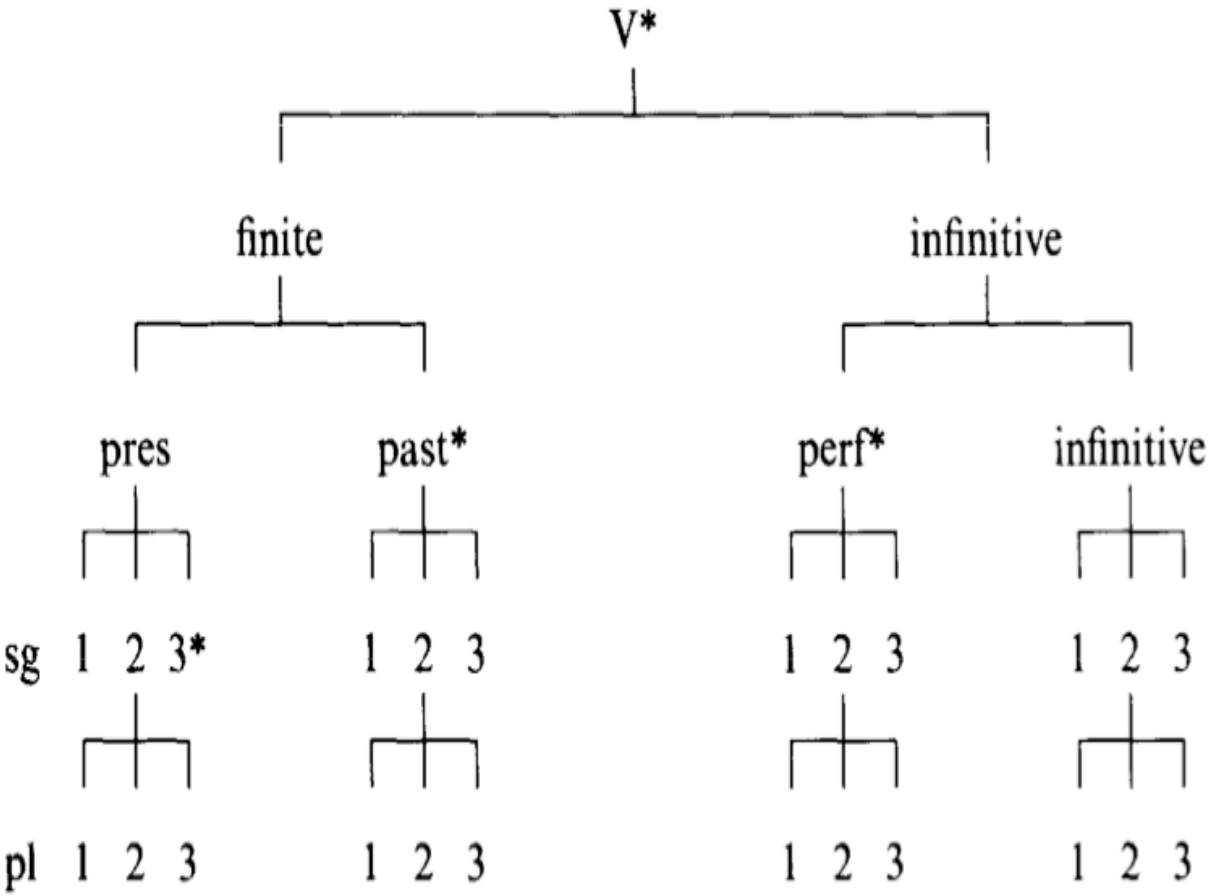
and each structural position contains a unique form

Sumerian Paradigms (Plank, 1991)

<dominus,domino,dominum,domini,dominis,dominos>

<hortus,horto,hortum,horti,hortis,hortos>

Paradigm á la Williams (1994)



V* = *run* past* = *ran* 3* = *runs* perf* = *run*

Lexicon vs. Paradigm

Lexicon: { dominus:[+N] }

	sg	**pl**
Nom	domin**us**	domin**i**
Dat	domin**o**	domin**is**
Acc	domin**um**	domin**os**

Lexicon vs. Paradigm

Lexicon: { dominus:[+N+nom+sg] }

	sg	**pl**
Nom	domin**us**	domin**i**
Dat	domin**o**	domin**is**
Acc	domin**um**	domin**os**

Lexicon vs. Paradigm

Lexicon: { dominus:[+N+nom+sg], domini:[+N+nom+pl],
domino:[+N+dat+sg], dominis:[+N+dat+pl],
dominum:[+N+acc+sg], dominos:[+N+acc+pl] }

	sg	**pl**
Nom	domin**us**	domin**i**
Dat	domin**o**	domin**is**
Acc	domin**um**	domin**os**

Lexicon vs. Paradigm

Lexicon: { -us:[+nom+sg], -i:[+nom+pl],
-o:[+dat+sg], -is:[+N+dat+pl],
-um:[+acc+sg], -os:[+N+acc+pl] }

	sg	pl
Nom	-us	-i
Dat	-o	-is
Acc	-um	-os

Wunderlich's Observation (implicit in Wunderlich & Fabri, 1994)

A set of affixes implicitly encodes a paradigm

(Generalized: A set of forms annotated by feature structures implicitly encodes a paradigm)

What is a Paradigmatic Theory of Morphology?

A theory which makes crucial use

of paradigms

to derive words/word forms

Related Notions (and Theories)

- Realizational Morphology
- Word-based Morphology
- Analogy

Realizational Morphology: German Verb Inflection

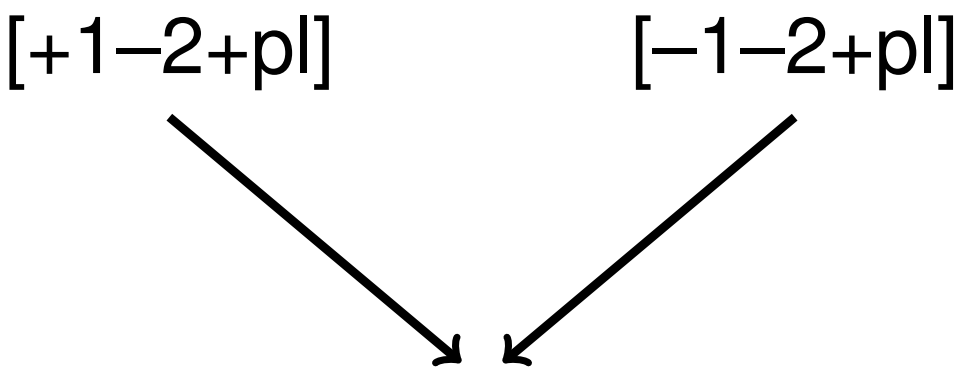
Present

	sg	pl
1	leg-**e**	leg-**en**
2	leg-**st**	leg-**t**
3	leg-**t**	leg-**en**

(ich lege, ‘I put’)

Realizational Morphology: Distributed Morphology

Syntactic Heads



Vocabulary Items

-n ↔ [-2+pl]

(Frampton, 2003; Müller, 2005; Trommer, 2005)

Realizational Morphology

is not per se paradigmatic

because underspecification & competition
don't require the use of paradigms

(although a list of Vocabulary Items might be understood

as a lexicon and hence as a rudimentary paradigm)

Word-based Grammar for Latin

Lexicon: { hortus:[+N+nom], dominus:[+N+nom] }

Rules:

X-us:[+N+nom] $\longrightarrow$ X-um:[+N+acc]
X-us:[+N+nom] $\longrightarrow$ X-o:[+N+dat]

See Albright (2002,2008) for a recent approach along similar lines

Word-based Morphology

is not per se paradigmatic

because application of Word Formation Rules

doesn't require the use of paradigms

Analogy

$$\frac{\text{dominus}}{\text{domino}} = \frac{\text{hortus}}{??}$$

Primitive Analogy Rule for Suffixation

If the lexicon contains

a word form WF_1 of the word W_1 of category C, (dominus)
a word form WF'_1 of the word W_1 of category C', (dominum)

a word form WF_2 of the word W_2 of category C (hortus)

where $\text{Phon}(WF_1) = AX$, $\text{Phon}(WF'_1) = AY$, and $\text{Phon}(WF_2) = BX$

then there is also a word form WF'_2 (hortum)
such that $Cat(WF'_2) = C'$ and $\text{Phon}(WF'_2) = BY$

Primitive Analogy Rule for Suffixation

	Word 1	**Word 2**
Category *C*	**A+X**	**B+X**
Category *C′*	**A+Y**	**B+Y**

- In the lexicon
- derived

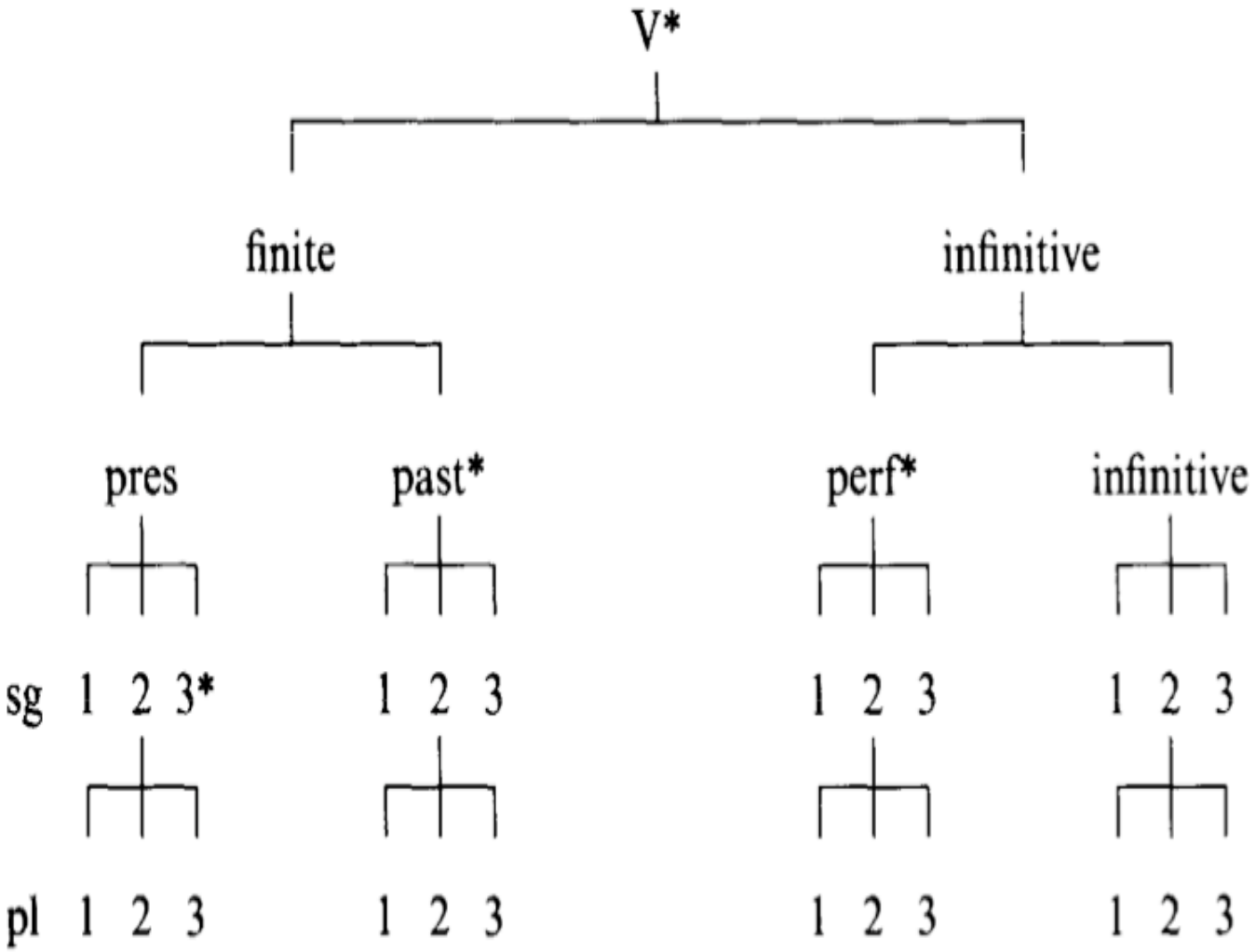
Analogy

- might be said to be inherently paradigmatic
  since it invokes a local paradigmatic structure in the construction of novel form
- But the paradigm used is minimal and does not really correspond to standard inflectional paradigms
- Crucially, analogy seems rather to access the lexicon in a complex way but not to use a real paradigm

Williams (1994)

- Word forms produced by affixation
  are linked by stipulation to specific entry points
  of a 3-dimensional hierarchically structured paradigm
- Every node of the paradigm corresponds to a word form
- Every node inherits the shape
  of the closest entry node which dominates it

Williams (1994)



V* = *run* past* = *ran* 3* = *runs* perf* = *run*

Optimal Paradigms Theory (McCarthy, 2005)

- Correspondence-theoretic Approach to Morphophonology
- In contrast to Standard OT, candidates are not single word forms, but entire inflectional paradigms
- Faithfulnes constraints require uniformity between all members of a candidate paradigm

Nopi Noun Morphology

Class U

singular	u-kat	u-ser	u-fli
plural	u-kat**-pu**	u-ser**-pu**	u-fli**-pu**

Class I

singular	i-tek	i-nol	i-lu
plural	i-tek**-ti**	i-nol**-ti**	i-lu**-ti**

Class A

singular	a-lap	a-pes	a-ta
plural	a-lap**-ka**	a-pes**-ka**	a-ta**-ka**

Nopi Nasal-Final Nouns

Class U

singular	u-kam	u-sen	u-fliŋ
plural	u-ka**m-pu**	u-se**m-pu**	u-fli**m-pu**

Class I

singular	i-tem	i-non	i-luŋ
plural	i-te**n-ti**	i-no**n-ti**	i-lu**n-ti**

Class A

singular	a-lam	a-pen	a-taŋ
plural	a-la**ŋ-ka**	a-pe**ŋ-ka**	a-ta**ŋ-ka**

Standard OT Analysis of Nopi Nasal Assimilation

Input: sen		SHARE-PLACE (NASAL,STOP)	IDENT_{IO}
☞	sen		
	sem		*!

Input: sen-pu		SHARE-PLACE (NASAL,STOP)	IDENT_{IO}
	senpu	*!	
☞	sempu		*

OP-Analysis of Nopi Nasal Assimilation

Input: <sen,sen-pu>	SHARE-PLACE (NASAL,STOP)	IDENT_{IO}	IDENT_{OP}
<sen,senpu>	*!		
<sem,sempu>		**!	
☞ <sen,sempu>		*	*

Opi Noun Morphology (= Nopi Noun Morphology)

Class U

singular	u-kat	u-ser	u-fli
plural	u-kat**-pu**	u-ser**-pu**	u-fli**-pu**

Class I

singular	i-tek	i-nol	i-lu
plural	i-tek**-ti**	i-nol**-ti**	i-lu**-ti**

Class A

singular	a-lap	a-pes	a-ta
plural	a-lap**-ka**	a-pes**-ka**	a-ta**-ka**

Opi Nasal-Final Nouns

Class U

singular	u-kam		
plural	u-ka**m-pu**		

Class I

singular		i-non	
plural		i-no**n-ti**	

Class A

singular			a-taŋ
plural			a-taŋ**-ka**

OP-Analysis of Opi Nasal Assimilation

Input: <sen,sen-pu>	SHARE-PLACE (NASAL,STOP)	IDENT_{OP}	IDENT_{IO}
<sen,senpu>	*!		
☞ <sem,sempu>			**
<sen,sempu>		*!	*

Other Morphological Paradigmatic Theories?

- **Amorphous Morphology (Anderson, 1992):** realizational approach with roughly the same architecture as DM
- **Paradigm Function Morphology (Stump, 2001):** assumes paradigms, but doesn't employ any operation which actually requires paradigms
- **Minimalist Morphology (Wunderlich & Fabri, 1994):** restricted use of paradigms to project affix specifications to lexical entries

Other Phonological Paradigmatic Theories?

- **Transderivational Corespondence Theory (Benua, 1995):**
  Asymmetric Architecture which is largely isomorphic to stratal approaches

- **Uniform Exponence (Kenstowicz 1996):**
  Predecessor of OP with unclear formal properties

- **Burzio (1994,1996,1999):**
  Extension of paradigms to relations between affixes and different lexemes

Morphological Arguments for Paradigmatic Theories

- Paradigmless theories cannot account for systematic syncretism and blocking (Williams, 1994)
- There are general formal restrictions on paradigmatic structure which cannot be captured without a formal representation of paradigms

Paradigmless Theories . . .

- don't explain **Blocking**
- cannot capture systematic **Meta-Syncretism**
- don't account for **Asymmetries between Features**

(Williams, 1994)

Meta-Syncretism in German

Present

	sg	pl
1	leg-**e**	leg-**en**
2	leg-**st**	leg-**t**
3	leg-**t**	leg-**en**

	sg	pl
1	bi-**n**	sind-**Ø**
2	bi-**st**	sei-**t**
3	is-**t**	sind-**Ø**

Past

	sg	pl
1	leg-t-**e**	leg-t-**en**
2	leg-t-**est**	leg-t-**et**
3	leg-t-**e**	leg-t-**en**

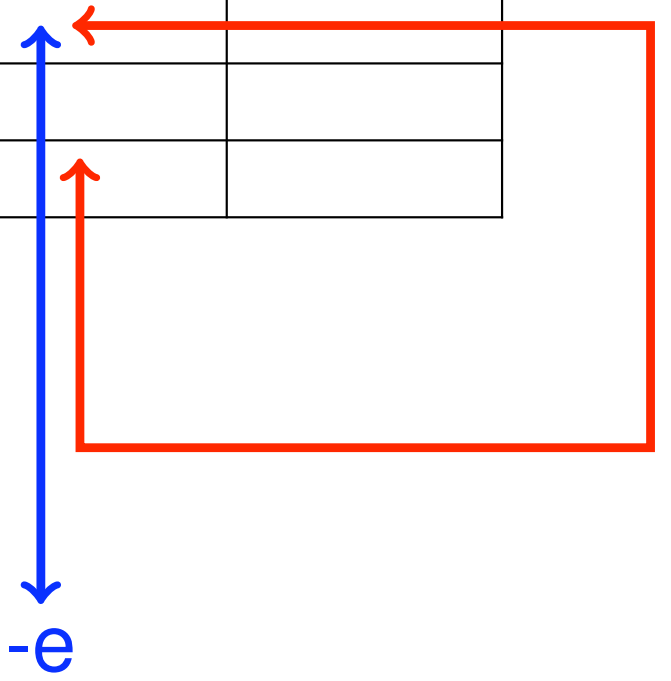
	sg	pl
1	war-**Ø**	war-**en**
2	war-**st**	war-**t**
3	war-**Ø**	war-**en**

(German; lege, ‘I put’; bin, ‘I am’)

Meta-Syncretism as a paradigmatic Rule of Referral

Rule of Referral

	Num:sg	Num:pl
Per:1		
Per:2		
Per:3		



Rule of Exponence

-e

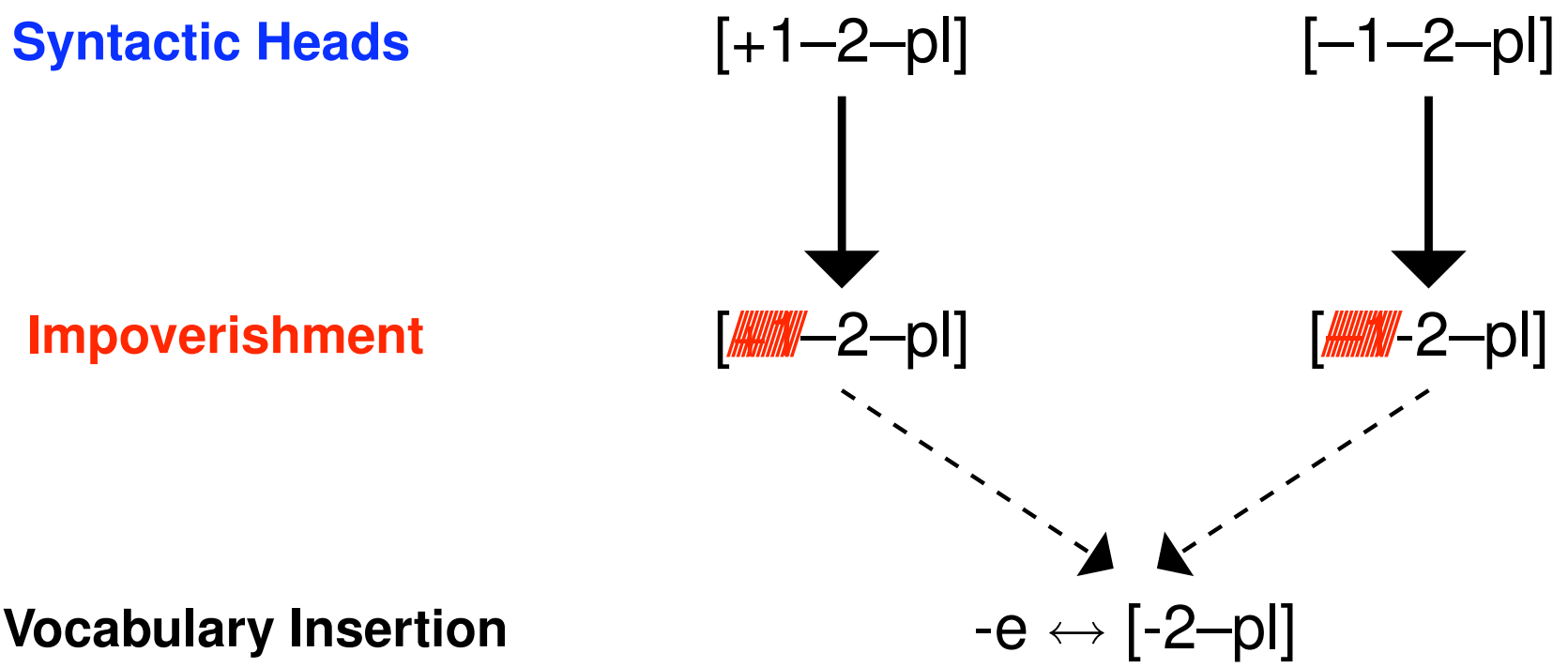
(Stump,1993,2001)

Bobaljik's (2002) Reply

William's arguments are not for paradigms but for realizational models of morphology such as DM

- **Blocking:**
  VI-competition for Vocabulary Insertion
- **Meta-Syncretism:**
  Impoverishment of Features before Vocabulary Insertion
- **Feature Asymmetries:**
  Vocabulary Insertion is governed by Feature Hierarchies

Meta-Syncretism as Impoverishment in DM



Formal Restrictions on Possible Paradigms

- The NoBlur Principle for Inflectional Classes (Carstairs-McCarthy, 1994)
- Iconicity in Latin Declension (Wiese, 2003)
- The Instantiated Basic Paradigm Requirement (Williams, 1994)

NO-BLUR: (Carstairs-McCarthy, 1994)

In a paradigm comprising different arbitrary inflectional classes
for a given feature combination at most one exponent
can occur in more than one paradigm cell

good

Conjugation	1	2	3	4
1sg	a	a	b	c
3pl	c	d	d	e

bad

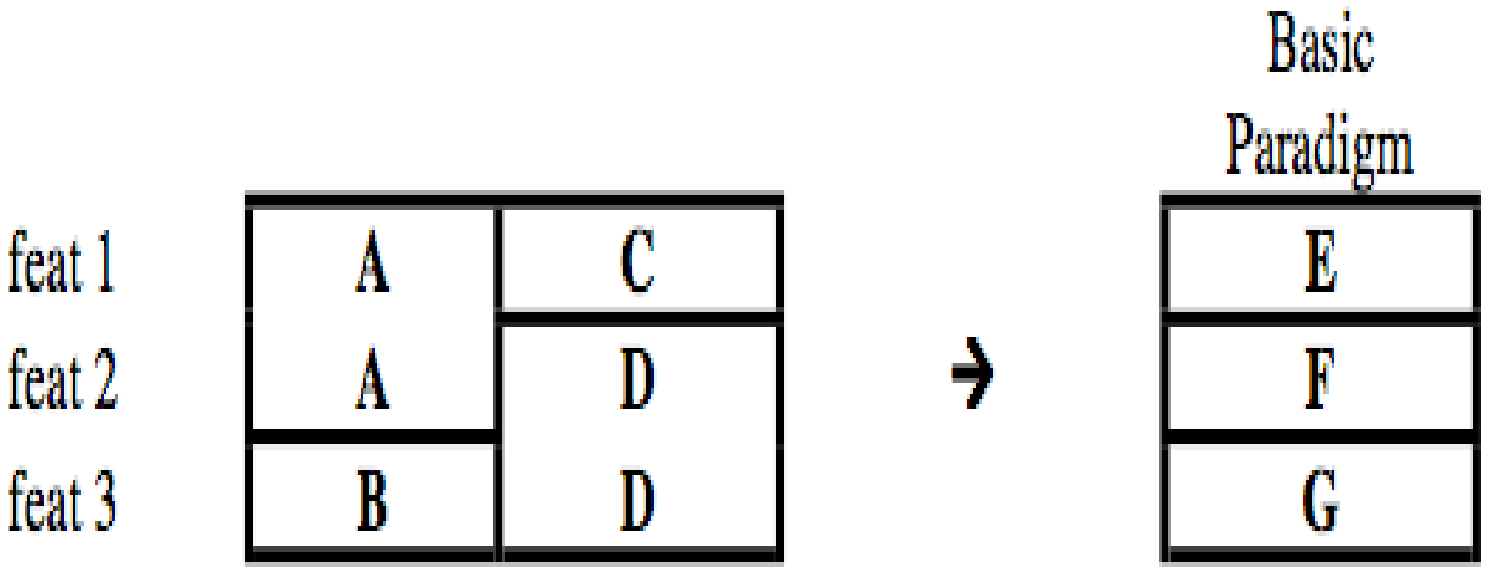
Conjugation	1	2	3	4
1sg	a	a	b	b
3pl	c	d	d	e

Halle & Marantz (2008) on NoBlur

NoBlur isn't a restriction on paradigms,
but on the grammatical use of inflectional class features.

Every noun can only belong to a single inflectional class
(specify a single inflectional class feature)

The Instantiated Basic Paradigm Requirement (Williams, 1994)



Form-Function Mapping in Latin Declension (Wiese, 2003)

Endungstypen/Marker/Endungen (formale Ordnung)

Formtyp	0	1	2	3	4	5	6	6+	7	7+
Marker	——	**s**	**m**	**L**	**vL**	**Ls**	**vLs**	**-X-s**	**vm**	**-X-m**
u-Dek.	*-u*	*-us*	*-um*	*-u:*	*-ui:*	*-u:s*		*-ibus*	*-uum*	
e-Dek.		*-e:s (!)*	*-em*	*-e:*	*-ei*	*-e:s*		*-e:bus*		*-e:rum*
a-Dek.	*-a*		*-am*	*-a:*	*-ae*	*-a:s*	*-i:s*			*-a:rum*
o-Dek.	*-e*	*-us*	*-um*	*-o:*	*-i:*	*-o:s*	*-i:s*			*-o:rum*

u-Dek.	VNA_{Ntr}	VN	A	Ab	D	G VNA_{Pl}	AbD_{Pl}	G_{Pl}
e-Dek.		VN	A	Ab	DG	VNA_{Pl}	AbD_{Pl}	G_{Pl}
a-Dek.	VN		A	Ab	DG VN_{Pl}	A_{Pl}	AbD_{Pl}	G_{Pl}
o-Dek.	V	N	A	AbD	G VN_{Pl}	A_{Pl}	AbD_{Pl}	G_{Pl}
	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*

Paradigmenfelder (funktionale Ordnung)

Phonological Arguments for Paradigms

- **Paradigm Uniformity:** Phonological Effects, which are motivated in one part of a paradigm are transferred to other parts of the paradigm where they aren't motivated

- **Paradigm, Distinctness:** Phonological effects are suppressed, if otherwise distinct paradigm cells would fall together

Paradigm Uniformity: Albanian Word Stress

	Final V (‘midwife’)	Final VC (‘gander’)
Nominative Indefinite	**bá**.bo	pa.**tók**
Accusative Definite	**bá**.bon	pa.**tó**.kun

- In nominative-indefinite forms final heavy syllables trigger final stress and final light syllables trigger penultima stress
- Accusative definite forms inherit the stress position of the nominative indefinite regardless of the phonological structure of the form itself

Paradigm Distinctness

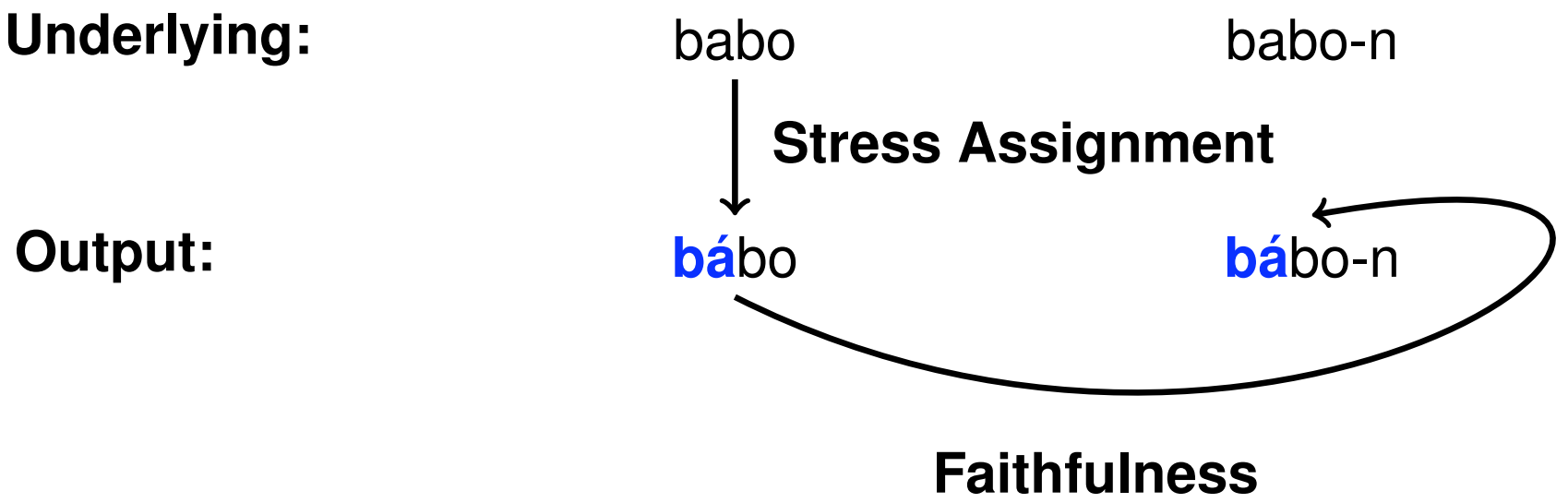
Vowel Reduction in Trigrad Bulgarian: Unstressed o → a

a.	/rog+ave/	rógave	‘horns’
	/rog+ave+te/	ragavéte	‘the horns’
b.	/ok+o/	óka	‘eye’
	/ok+o+to/	akóta	‘the eye’

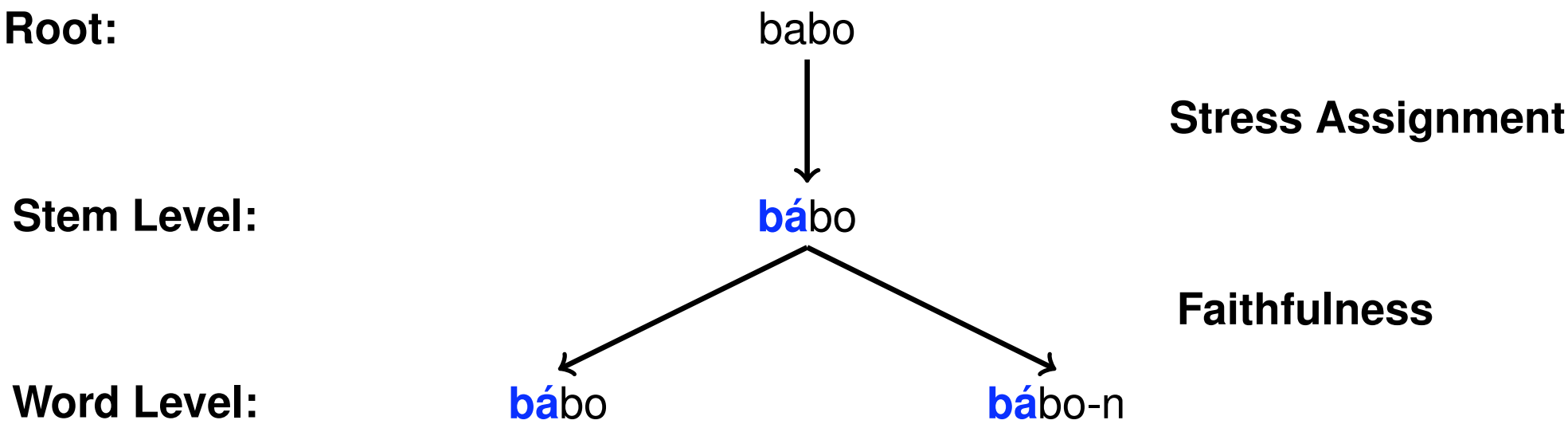
No reduction, if this would lead to homonymy (Kenstowicz, 2005)

	sg. /-o/	**pl. /-a/**	
a.	kláb-a	klab-á	‘ball of thread’
	pér-a	per-á	‘feather’
b.	zórn-o	zórn-a	‘grain, seed’
	pétal-o	pétal-a	‘horseshoe’
	blág-o	blág-a	‘blessing’

Paradigm Uniformity under a paradigmatic account



Paradigm Uniformity in a Stratal Architecture



Potentially Decisive Phonological Evidence for Paradigms

- **Anticyclic Uniformity:**
  Phonological properties triggered in derived forms are inherited by bases
- **Idiosyncratic Uniformity:**
  Paradigm shape of specific lexemes affects paradigm uniformity/distinctness
- **Split Bases:**
  Word forms inherit properties of more than one base

Anticyclic Uniformity in Nopi Nasal Assimilation

Input: <sen,sen-pu>	SHARE-PLACE (NASAL,STOP)	IDENT_{OP}	IDENT_{IO}
<sen,**senpu**>	***!**		
☞ <**sem**,sempu>			**
<**sen**,sempu>		***!**	*

- Trigger in the derived form
- Effect in the basic form

Opi Nasal-Final Nouns

Class U Count Nouns

singular	u-kam		
plural	u-ka**m-pu**		

Class U Mass Nouns

singular	u-kam	u-lin	u-loŋ
plural			

Idiosyncratic Uniformity in Nopi Nasal Assimilation

Input: <sen,sen-pu>	SHARE-PLACE (NASAL,STOP)	IDENT_{OP}	IDENT_{IO}
<sen,**senpu**>	*!		
☞ <**sem**,sempu>			**
<**sen**,sempu>		*!	*

Input: <lin>	SHARE-PLACE (NASAL,STOP)	IDENT_{OP}	IDENT_{IO}
☞ <lin>			
<lim>			*!*

Split Bases in French (Steriade, 1999)

	prochain	arrêt	‘next-MASC stop’
Dialect 1	[pʁɔʃ**ɛ̃n**]	[aʁe]	
(**Dialect 2**	[pʁɔʃ**ɛn**]	[aʁe])	

Base 1	**Base 2**	**“Derived” Form**
MASC. Non-liaison [pʁɔʃ**ɛ̃**]	FEM. Non-liaison [pʁɔʃ**ɛn**]	MASC. Liaison [pʁɔʃ**ɛ̃n**]