

# Multiple Feature Mutation and REALIZE MORPHEME

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## Multiple Feature Mutation in Texistepec Popoluca

- ▶ 1st person nominative verb forms are marked by nasalizing the initial consonant
- ▶ 2nd person nominative verb forms are marked by nasalizing and palatalizing the initial consonant
- ▶ 3rd person nominative verb forms are marked by denasalizing and palatalizing the initial consonant

Root	1P	2P	3P	
dastah	nastah	n <sup>j</sup> astah	d <sup>j</sup> astah	'dig'
naj	naj	n <sup>j</sup> aj	d <sup>j</sup> aj	'sprout'

(Reilly, 2002)

# Crucial Point

**Wolf (2005):** Multiple-feature Mutation  
requires a faithfulness constraint  
specific to floating features (MAXFLT)

**Claim here:** MAXFLT is superfluous  
under appropriate morphological analysis

# Overview

## Why Multiple Feature Mutation is problematic

- Simple Mutation

- Multiple Feature Mutation

## Multi-Feature Mutation by Fission

- Fission in DM

- Fission of Floating Features

## Mutation in Nuer

- Multiple-Feature Mutation

- Mutation and Affixation

## Simple Voicing Mutation in Aka (Akinlabi, 1996; Wolf, 2005)

### Class 5 - singular

### Class 6 - plural

**g**̀̀àlà

**b**̀̀èlèlé

**dʒ**́ám̀̀bà

**d**̀̀èngé

**g**́ásá

**b**̀̀àp̀̀ùl̀̀àkà

mà-**g**̀̀àlà

mà-**b**̀̀èlèlé

mà-**dʒ**́ám̀̀bà

ma-**t**̀̀èngé

ma-**k**́ásá

ma-**p**̀̀àp̀̀ùl̀̀àkà

(game of imitation)

‘sound of waterfall’

‘mud’

‘piercing tool’

‘palm branch’

‘lung’

Singular of class 5 is expressed by voicing the initial consonant

# Autosegmental Analysis (Lieber, 1987; Zoll, 1996; Wolf, 2005)

**[+voice]** ↔ [+sing]

+

→

g<sub>[+voice]</sub>asa

k<sub>[-voice]</sub>asa ↔ [+N]

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**Crucial Question:** Why can the floating feature overwrite the segmental one?

# Overwriting by REALIZE MORPHEME

Input: [+vc] + k<sub>[-vc]</sub>asa

	REALIZEMORPHEME	IDENT
☞ a. g <sub>[+vc]</sub> asa		*
b. k <sub>[-vc]</sub> asa	*!	

**REALIZE MORPHEME:** For every morpheme in the input, some phonological element should be present in the output.

(van Oostendorp, 2005; ≈ Akinlabi, 1996)

# Overwriting by MAXFLT

Input: [+vc] + k<sub>[-vc]</sub>asa

	MAXFLOAT	IDENT
☞ a. g <sub>[+vc]</sub> asa		*
b. k <sub>[-vc]</sub> asa	*!	

**MAXFLT:** All autosegments that are floating in the input have output correspondents.

(Wolf, 2005; ≈ Zoll, 1996)



# Multiple Feature Mutation in Texistepec Popoluca

Root	1P	2P	3P	
dastah	nastah	n <sup>j</sup> astah	d <sup>j</sup> astah	'dig'
naj	naj	n <sup>j</sup> aj	d <sup>j</sup> aj	'sprout'


[+1] ↔ [+nasal]


[+2] ↔ [+nasal-back] (Wolf, 2005)

[+3] ↔ [-nasal-back]

# MAXFLT vs. REALMORPH in Multiple-Feature Mutation

Input: [-nas-bk] +  $n_{[+nas+bk]}aj$

	MAXFLT	IDENT
 a. $d_{[-nas-bk]}^j aj$		**
b. $d_{[-nas+bk]} aj$	*!	*
c. $n_{[+nas+bk]} aj$	*!*	

	REALMRPH	IDENT
a. $d_{[-nas-bk]}^j aj$		**!
 b. $d_{[-nas+bk]} aj$		*
c. $n_{[+nas+bk]} aj$	*!	

# The Problem for REALIZEMORPHEME

REALIZEMORPHEME ...

- ▶ ... quantifies existentially, not universally
- ▶ ... is satisfied if at least one floating feature is realized
- ▶ ... doesn't enforce realization of all features in multiple-feature mutation

(Wolf, 2005)

# Fission of Person and Number in Muna (van den Berg, 1989)

	sg	pl
1	a-kala	ta-kala
12	do-kala	do-kala-amu
2	o-kala	o-kala-amu
2 (polite)	to-kala	to-kala-amu
3	no-kala	do-kala

Subject Agreement is partially expressed by one affix (e.g. ta-) and partially fissioned into person and number (e.g. o- -amu)

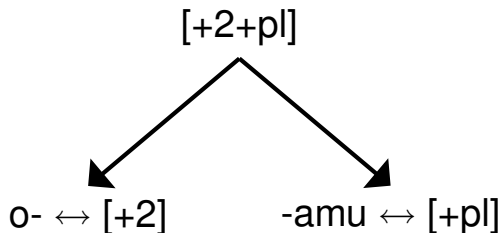
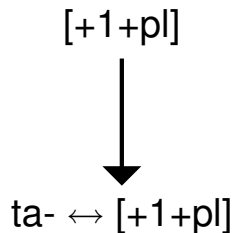
# Fission in Distributed Morphology

- ▶ Syntax provides heads with morphosyntactic features, but without phonological content (e.g. [+1+pl])
- ▶ Morphology realizes heads phonologically by vocabulary items (e.g. ta- ↔ [+1+pl])
- ▶ In Fission features of 1 head are expressed by more than 1 vocabulary item (e.g. [+2+pl] by o- ↔ [+2] and -amu ↔ [+pl])

(Noyer, 1992; Halle & Marantz, 1993; Frampton, 2003; Müller & Trommer, 2006)

(Similar Proposals in OT: Noyer, 1993; Trommer, 2001; Wunderlich, 2003)

# Fission in Distributed Morphology



# Fission of Person in Menominee

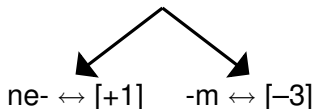
(Trommer, 2007; data from Bloomfield, 1962)

**ne-po:se-m**

[+1]-embark-[-3]

'I embark'

[+1-2-3]

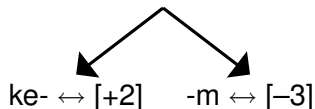


**ke-po:se-m**

[+2]-embark-[-3]

'you embark'

[-1+2-3]

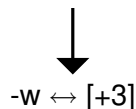


**po:se-w**

embark-[+3]

'he embarks'

[-1-2+3]



# Fission of Person in Sierra Popoluca (Müller, 2005)

Abs		Erg	
[+1-2-Erg]	a-	[+1-2+Erg]	a-n-
[+1+2-Erg]	t-a-	[+1+2+Erg]	t-a-n-
[-1+2-Erg]	m-i-	[-1+2+Erg]	i-n-
[-1-2-Erg]	-	[-1-2+Erg]	i-

Abs	Erg	
[+1-2-Erg]	[-1+2+Erg]	a-n
[-1+2-Erg]	[+1-2+Erg]	m-a-n-
[-1-2-Erg]	[-1-2+Erg]	i-
[-1-2-Erg]	[+1-2+Erg]	a-n-
[-1-2-Erg]	[-1+2+Erg]	i-n-
[+1-2-Erg]	[-1-2+Erg]	a-
[-1+2-Erg]	[-1-2+Erg]	m-i-

n-	↔	[+Erg]	
a-	↔	[+1]	
i-	↔	[-1]	
m-	↔	[+2]	/ [-Erg]
t-	↔	[+2]	/ [+1]



# Texistepec Popoluca by Multiple Feature Mutation

Root	1P	2P	3P	
<b>d</b> astah	<b>n</b> astah	<b>n<sup>j</sup></b> astah	<b>d<sup>j</sup></b> astah	'dig'
<b>n</b> aj	<b>n</b> aj	<b>n<sup>j</sup></b> aj	<b>d<sup>j</sup></b> aj	'sprout'

[+1] ↔ [+nasal]

[+2] ↔ [+nasal-back] (Wolf, 2005)

[+3] ↔ [-nasal-back]

# Texistepec Popoluca by Fission of Floating Features

Root	1P	2P	3P	
<b>d</b> astah	<b>n</b> astah	<b>n</b> <sup>j</sup> astah	<b>d</b> <sup>j</sup> astah	'dig'
<b>n</b> aj	<b>n</b> aj	<b>n</b> <sup>j</sup> aj	<b>d</b> <sup>j</sup> aj	'sprout'

[-3] ↔ [+nasal] (1st and 2nd person)

[-1] ↔ [-back] (2nd and 3rd person)

[+3] ↔ [-nasal] (3rd person)

# Texistepec Popoluca by Fission of Floating Features

**1p**

nastah

[+1-2-3]

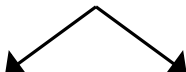


[+nas] ↔ [-3]

**2p**

n<sup>j</sup>astah

[-1+2-3]

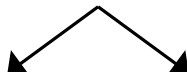


[+nas] ↔ [-3]   [-back] ↔ [-1]

**3p**

d<sup>j</sup>astah

[-1-2+3]



[-nas] ↔ [+3]   [-back] ↔ [-1]

(cf. dastah, 'dig')

# REALIZEMORPHEME Rehabilitated

Input: [+nas] + [-back] + d<sub>[-nas+bk]</sub>astah

	REALIZEMORPHEME	IDENT
☞ a. n <sup>j</sup> <sub>[+nas-back]</sub> astah		**!
b. d <sup>j</sup> <sub>[-nas-back]</sub> astah	*!	*
c. n <sub>[+nas+back]</sub> astah	*!	*
d. d <sub>[+nas+bk]</sub> astah	*!*	

- ▶ REALMORPH refers to Vocabulary Items, not to Heads
- ▶ Since every floating feature is a morpheme, every floating feature must be realized
- ▶ MAXFLT gets superfluous

# Multi-Feature Mutation + Affixation in T. Popoluca

Root	1P	12 P	2P	3P	
dastah	nastah	ta-nastah	n <sup>j</sup> astah	d <sup>j</sup> astah	'dig'
naj	naj	ta-naj	n <sup>j</sup> aj	d <sup>j</sup> aj	'sprout'

[-3] ↔ [+nasal] (1st and 2nd person)

[-1] ↔ [-back] (2nd and 3rd person)

[+3] ↔ [-nasal] (3rd person)

[+1+2] ↔ ta- (1st person inclusive)

# Multi-Feature Mutation in Nuer Infinite Forms (Crazzolara, 1933)

	'over- take'	'hit'	'pull out'	'scoop hastily'	
Infinitive	coβ	ja:ç	guð	kêp	
Negat. Pres. Ptc.	cò <b>p</b>	ja: <b>c</b>	gu <b>t</b>	ke <b>p</b>	[-voice -continuant]
Past Ptc.	co <b>f</b>	ja: <b>ç</b>	gu <b>θ</b>	kè <b>f</b>	[-voice +continuant]

[+Part +Neg -Past] ↔ [-voice -continuant]

(Wolf, 2005)

[+Part+Past] ↔ [-voice +continuant]

# Multi-Feature Mutation in Nuer by Fission

	'over- take'	'hit'	'pull out'	'scoop hastily'	
Infinitive	coβ	ja:ç	guǔ	kêp	
Negat. Pres. Ptc.	cò <b>p</b>	ja: <b>c</b>	gu <b>t</b>	ke <b>p</b>	[-voice -continuant]
Past Ptc.	co <b>f</b>	ja: <b>ç</b>	gu <b>θ</b>	kè <b>f</b>	[-voice +continuant]

[+Part] ↔ [-voice]

[+Past] ↔ [+continuant]

[+Neg] ↔ [-continuant]

# Affixal Fission in German Infinite Forms

	Weak	Strong
<b>Infinitive</b>	weh- <b>en</b>	seh- <b>en</b>
<b>Present Participle</b>	weh- <b>en-d</b>	seh- <b>en-d</b>
<b>Past Participle</b>	<b>ge</b> -weh- <b>t</b>	<b>ge</b> -seh- <b>en</b>
<b>Past 2sg</b>	weh- <b>t</b> -est	sah-st

[+Tense +Past] ↔ -t

[+Tense] ↔ -n

[+Part] ↔ -d / \_\_\_\_\_ [-Past]

[+Part] ↔ ge-



# Multi-Feature Mutation + Affixation in Nuer (Crazzolara, 1933)

	'overtake'	'pull out'	'scoop hastily'	
Infinitive	coβ	guð	kêp	
3sg.ind.pres.act.	cóβ-έ	gúð-έ	kέβ-έ	[+vc+cont]-ε
1pl.ind.pres.act.	còɔf-kò	gwòθ-kò	kèaf-kò	[-vc+cont]-kò

[+3+Ind-Past+Act] ↔ [+voice+continuant]-ε

(Wolf, 2005)

[+1+pl-Past+Act] ↔ [-voice+continuant]-kò

# Full Present Indicative Active Paradigm of Nuer

	singular	dual	plural
<b>1 (exc.)</b>	ka:β-à		ka:f-kó
<b>1 (inc.)</b>		ka:f-nè	ka:f-né
<b>2</b>	ka:β-ì		ka:f-é
<b>3</b>	ka:β-è		ka:f-ké

(ká:f, 'to lay hold of')

	singular	dual	plural
<b>1 (exc.)</b>	[+vc+cont]-a		[-vc+cont]-kɔ
<b>1 (inc.)</b>		[-vc+cont]-nè	[-vc+cont]-ne
<b>2</b>	[+vc+cont]-i		[-vc+cont]-e
<b>3</b>	[+vc+cont]-ε		[-vc+cont]-kε

# Lost Generalizations

	singular	dual	plural
1 (exc.)	[+VC+cont]-a		[-VC+cont]-kɔ
1 (inc.)		[-VC+cont]-nè	[-VC+cont]-ne
2	[+VC+cont]-i		[-VC+cont]-e
3	[+VC+cont]-ε		[-VC+cont]-kε

- ▶ In all indicative active forms  
the stem-final consonant is [+continuant]
- ▶ In all singular forms,  
the stem-final consonant is [+voice]
- ▶ In all non-singular forms,  
the stem-final consonant is [-voice]

# Affixation + Mutation in Nuer as Fission

	singular	dual	plural
1 (exc.)	[+VC+cont]-a		[-VC+cont]-kɔ
1 (inc.)		[-VC+cont]-nè	[-VC+cont]-ne
2	[+VC+cont]-i		[-VC+cont]-e
3	[+VC+cont]-ε		[-VC+cont]-kε

[-pl] ↔ [+voice]

[+pl] ↔ [-voice]

[+Ind-Past+Act] ↔ [+continuant]



# Summary

- ▶ Morphological Fission obviates MAXFLOAT and similar constraints
- ▶ Fission captures generalizations not available under multiple-feature mutation accounts
- ▶ Mutation and affixal morphology are even more similar than previously thought