Syllable-counting Allomorphy by Indexed Constraints

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Plot

- **Paster (2005, 2006):**
  Syllable-counting allomorphy is not generally optimizing and must derived by morphological subcategorization

- **This Talk:**
  "Non-optimizing" allomorphy derives from optimizing lexically indexed constraints

Syllable-counting Phonological Suppletion in Estonian

	Nom.sg.	Gen.sg.	Gen.pl.	Part.pl.	
2 σ	visa	visa	visa-**te**	visa-**sit**	“block”
3 σ	paras	paraja	paraja-**tte**	paraja-**it**	‘suitable’
4 σ	atmiral	atmirali	atmirali-**te**	atmirali-**sit**	‘Admiral’

Stem with even syllable number $\Rightarrow$ **-sit**

Stem with odd syllable number $\Rightarrow$ **-it**

Terminology

Phonologically conditioned suppletive allomorphy

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Phonological Suppletion

Syllable Counting as Phonology (Kager, 1996)

ALIGN-ST-R	The right edge of a stem should coincide with the right edge of a foot
FOOTING	Different constraints which assign bisyllabic trochees from left to right
STRESS2WEIGHT	Stressed syllables should be heavy

Syllable Counting as Phonology (Kager, 1996)

Input: visa+{-sit / -it}	FOOTING	ALIGN-ST-R	STR2WT
☞ a. [(ví.sa)-sit]			*
b. [(ví.sa-i)t]		*!	*
c. [vi.(sá-i).t]	*!		

Input: paraja+{-sit / -it}	FOOTING	ALIGN-ST-R	STR2WT
☞ a. [(pá.ra)(já-i)t]		*	**!
b. [(pá.ra)(já.si)t]		*	*
c. [(pá.ra-ja)-sit]	*!		*

Syllable Counting as Morphology (Paster, 2005)

-sit $\leftrightarrow$ [+part +pl] / [Foot#] ___

-it $\leftrightarrow$ [+part +pl]

Non-optimizing Phonological Suppletion in Tzeltal

Monosyllabic stems ➔ **-óh**

Polysyllabic stems ➔ **-ɛ́h**

s-ku'$\widehat{t\int}$**-óh**	"she carried it"	s-ku$\widehat{t\int}$-laj**-ɛ́h**	"she carried it repeatedly"
s-nuts**-óh**	"he chased sth.."	h-pak'-anta'j**-ɛ́h**	"I patched it"

(Paster, 2006:105)

Pasters Argumentation (2005:328)

“[o] and [ɛ] do not alternate elsewhere . . ., so the allomorphy is probably truly suppletive.

Stress in Tzeltal is word-final . . ., so the allomorphy is not stress-conditioned.

A constraint banning [ɛ] in the second syllable has not been proposed for UG, . . .

so this appears to be a case where we would not want to describe the distribution of allomorphs as phonologically optimizing in any way.”

Syllable Counting in Tzeltal as Morphology

-oh $\leftrightarrow$ perf / [#σ#] ____

-ɛh $\leftrightarrow$ perf

(Paster, 2006:105)

Overview

Lexically Indexed Constraints and Truncation

Simple Cases of Syllable-counting Allomorphy

Opaque Cases of Syllable-counting Allomorphy

Alternative Analyses

Theoretical Background

- **Lexically Indexed Constraints:**
  Morpheme-specific phonology derives from constraints indexed for specific (classes of) morphemes (Pater, 2006)

- **Stratal Optimality Theory:**
  Optimization applies at two ordered levels:
  the stem and the word level (Bermúdez-Otero, 2007, 2008)

Lexically Indexed Constraints

Dative Suffix: Velar Deletion

Nominative	Dative	
bebek	bebe-e	‘baby’
inek	ine-e	‘cow’

(Turkish)

Aorist Suffix: No Velar Deletion

Past	Aorist	
gerek-ti	gerek-ir	‘be necessary’
bırak-tı	bırak-ır	‘leave’

Lexically Indexed Constraints

$*VKV_{-e}$: Avoid the sequence Vowel - k - Vowel (Indexed for the suffix -e)

$*X_L$: Assign a violation mark to any instance of X that contains a phonological exponent of a morpheme specified as **L** (Pater, 2006)

$*X_L$: Assign a violation mark to any instance of X that contains a phonological exponent of an **allomorph** specified as **L** (proposed modification)

Lexically Indexed Constraints

Dative:

Input: inek-e	*VKV$_{\text{-e}}$	MAX-C
☞ a. ine-e		*
b. in**ek-e**	***!**	

Aorist:

Input: gerek-ir	*VKV$_{\text{-e}}$	MAX-C
a. gere-ir		
☞ b. gerek-ir		*!

Three Types of Truncation

- Truncation with internal affixation
- Truncation with external affixation
- Truncation without overt affixation

Truncation with Internal Affixation

Stu(dent)	→	(Studi)	‘student’
(Hausauf)(gabe)	→	(Hausi)	‘homework’
(Kinder)(garten)	→	(Kindi)	‘kindergarten’

(German hypocoristic formation: Féry, 1997)

The affix -i is **part of** the bisyllabic template

Truncation with External Affixation

Midori	→	(Mido)-čan, (Mii)-čan
Yooko	→	(Yo.ko)-čan, (Yoo)-čan
Akira	→	(A.ki)-čan

(Japanese hypocoristic formation: Benua, 1995)

The affix -čan is **outside of** the bimoraic template

Truncation without Overt Affixation

Isabél	→	(Í.sa)
Federíco	→	(Fé.de)
Gertrúdis	→	(Gér.tru)

(Spanish hypocoristic formation: Roca & Feliu, 2003:188)

Besides truncation there is no overt affix

Internal-affix Truncation by Indexing

Base:

Input: Student	PWd=BinFt$_{\text{-i}}$	Max	FtBin
a. Stu(dent)			*!
☞ b. (Stu.dent)			

Hypocoristic:

Input: Student-i	PWd=BinFt$_{\text{-i}}$	Max	FtBin
a. Stu**(den.ti)**	*!		
☞ b. **(Stu.di)**		***	

PWD=BINFT$_i$ Decomposed

Hypocoristic:

Input: Student-i	ALL-FT-LFT$_{-i}$	PARSE σ_{-i}
a. Stu**(den.ti)**	*!	
b. (Stu.den)**ti**		*!

Truncation without Overt Affixation

- Morpheme-specific phonology must be transmitted through affixation of phonological material
- Hence Truncation without overt affixation must be covert affixation:

  Affixation of phonological structure (e.g. a foot node) which is fully integrated into the base

Covert-Affix Truncation by Indexing

Base:

Input: Isabel	PWD=BINFT$_{\text{-F}}$	MAX
a. I.sa(bel)		
☞ b. (I.sa)		*!

Hypocoristic:

Input: Isabel-F	PWD=BINFT$_{\text{-F}}$	MAX
a. I.sa**(bel)$_{\text{F}}$**	*!	
☞ b. **(I.sa)**		***

External-Affixation Truncation

- is Bimorphemic:
- Truncation is derived by covert-affix truncation at the stem level
- External affixation reflects non-truncating affixation at the word level

External-Affixation Truncation

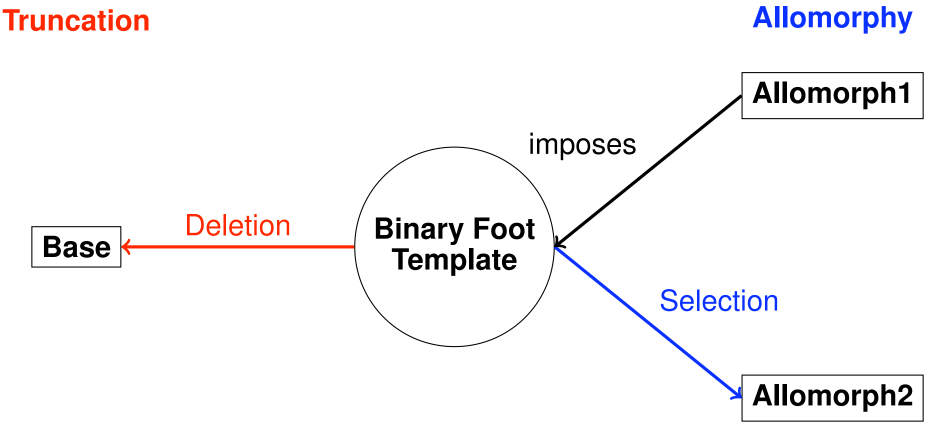
Input: Midori-F	PWD=BINFT$_{\text{-F}}$	MAX
a. Mi.do**(ri)**$_F$	*!	
☞ b. **(Mi.do)**		**

Stem Level

Input: Mido-čan	MAX
a. Mi.do-čan	
☞ b. Mi.do	*!**

Word Level

From Truncation to Syllable-counting Allormorphy



Phonological Analysis of Tzeltal

- **-oh** is the allomorph prefered by morphological constraints
- Lexically indexed constraints require that **-oh** can only appear in unmarked prosodic words (bisyllabic trochees)
- **-oh** appears in bisyllabic forms (with monosyllabic bases)
- **-ɛh** appears otherwise

Tzeltal by indexed-constraint optimization

Input: skutʃ+{ -ɛh / -oh }

	PWD=BINFT$_{\text{-oh}}$	PERF=oh
☞ a. (sku.tʃ-oh)		
b. (sku.tʃ-ɛh)		*!

Input: skutʃlaj+{ -ɛh / -oh }

	PWD=BINFT$_{\text{-oh}}$	PERF=oh
a. **skutʃ(la.j-oh)**	*!	
☞ b. skutʃ(la.j-ɛh)		*

Zuni (Language Isolate, New Mexiko)

Monosyllabic stems ➔ **-ʔleʔ**

Polysyllabic stems ➔ **-nne**

ɬí-**ʔleʔ**	‘sinew’	hóma-**nne**	‘juniper leaf’
ʃí-**ʔleʔ**	‘piece of meat’	téna-**nne**	‘song’

⇒ Analysis completely analogous to Tzeltal

Kaititj (Pama-Nyungan)

Bisyllabic stems ➔ **-ŋ**

Polysyllabic stems ➔ **-l**

akí-**ŋ**	'head'	alíki-**l**	'dog'
ilt^{y}í-**ŋ**	'hand'	aʈúyi-**l**	'man'
aNmí-**ŋ**	'red ochre'	aɣírki-**l**	'sun'
aynpí-**ŋ**	'pouch'	ɭúNpiri-**ɭ**	'forehead'

⇒ Analysis completely analogous to Tzeltal
(**-ŋ** appears in bisyllabic, **-l** in polysyllabic outputs)

Preliminary Observation

Bisyllabic templates are pervasive

Saami (Dolbey 1997)

	jearra- ‘to ask’	**veahkehea-** ‘to help’	**even**	**odd**
1du	je:r.re.**-Ø**	veah.ke.he:**-t.ne**	Ø	-tne
2du	jear.ra.**-beaht.ti**	veah.ke.hea**-hp.pi**	-beahtti	-hppi
2pl	jear.ra.**-beh.tet**	veah.ke.he:**-h.pet**	-behtet	-hpet
passive	je:r.ro.**-juv.vo**	veah.ke.hu**-v.vo**	-juvvo	-vvo

Saami as Pure optimization

Input: je:r.re+$\left\{ \begin{array}{c} \text{-Ø} \\ \text{-tne} \end{array} \right\}$

	PARSE σ
☞ a. (je:r.re-Ø)	
b. (je:r.re)-tne	*!

Input: veah.ke.he+$\left\{ \begin{array}{c} \text{-Ø} \\ \text{-tne} \end{array} \right\}$

	PARSE σ
a. (veah.ke).he-Ø	*!
☞ b. (veah.ke).(he-t.ne)	

Problem with Recursive Affixation

je:r.ro-**juv.vo-beaht.ti** 'you (two) ask' *je:r.ru-**v.vo-hp.pi**
ask-passive-2du

Input: je:r.ro+$\left\{ \begin{array}{c} \text{-juvvo} \\ \text{-vvo} \end{array} \right\}$+$\left\{ \begin{array}{c} \text{-beahtti} \\ \text{-hppi} \end{array} \right\}$

		PARSE σ
☞	a. (je:r.ro)**-(juv.vo)-(beaht.ti)**	
☛	b. (je:r.ru-**v)(vo-hp.pi)**	
	c. (je:r.ru-**v)(vo-beaht)ti**	*!
	d. (je:r.ro)**-(juv.vo-hp)pi**	*!

Stratal Optimization

Input: je:r.ro+ { -juvvo / -vvo }

	PARSE σ
☞ a. (je:r.ro)**-(juv.vo)**	
b. (je:r.ru-**v)vo**	*!

Stem Level

Input: je:r.ro.juv.vo+ { -beahtti / -hppi }

	PARSE σ
☞ a. (je:r.ro)-(juv.vo)**-(beaht.ti)**	
b. (je:r.ro)-(juv.vo-**hp)pi**	*!

Word Level

Dyirbal (Pama-Nyungan)

Bisyllabic stems ➔ **-ŋgu**

Polysyllabic stems ➔ **-gu**

ˈyara-**ŋgu**	‘man’	ˈya.maˈni-**gu**	‘rainbow’
ˈyugu-**ŋgu**	‘stick’	ˈdu.ɲaˈŋunu-**gu**	‘from leaves in water’

A tri-syllabic template?

Alternative Morphological Segmentation of Dyirbal

-ŋ/**-Ø** is a stem extension (stem level)

-gu is the ergative suffix (word level)

ˈ[yara-**ŋ**]-gu	‘man’	[ˈya.maˈni-**Ø**]-gu	‘rainbow’
ˈ[yugu-**ŋ**]-gu	‘stick’	[ˈdu.ɲaˈŋunu-**Ø**]-gu	‘from leaves in water’

⇒ Analysis at the stem level completely analogous to Tzeltal (**-ŋ** appears in bisyllabic, **-Ø** in polysyllabic outputs)

Dyirbal by Indexed-constraint Stem Optimization

Input: yara+{ ŋ / -Ø }

	PWd=BinFt$_{-ŋ}$	Ext=ŋ
☞ a. (ya.ra-ŋ)		
b. (ya.ra-Ø)		*!

Input: yamani+{ -ŋ / -Ø }

	PWd=BinFt$_{-ŋ}$	Ext=ŋ
a. ya**(ma.ni-ŋ)**	*!	
☞ b. ya(ma.ni-Ø)		*

Opaque Syllable Counting in Spanish

Input Stem

1 σ	**2** σ **(final V)**	**2** σ **(final C)**	**3** σ	**4** σ
vil	franquo	gentil	maduro	estúpido
vil**-eza**	franqu**-eza**	gentil**-eza**	madur**-ez**	estupid**-ez**
‘vile’	‘truthful’	‘gentle’	‘mature’	‘stupid’

Output Stem

1 σ	**2** σ	**3** σ
vil	gentil	estúpid
vil**-eza**	gentil**-eza**	estupid**-ez**
franqu	maduro	
franqu**-eza**	madur**-ez**	

Problem for a Phonological Account

gentil-**eza** and madur-**ez** should have the same allomorph

No Problem for a Subcategorization Account:

-ez $\leftrightarrow$ N / [... $\sigma\sigma\sigma$#] ____

-eza $\leftrightarrow$ N

(Paster, 2006:160)

gentil and maduro differ for the morphology

Stratal Analysis

- Deadjectival nominalization is bimorphemic:
  a stem-level affix (little a), and a word-level affix (little n)
  (+ the inflectional class marker in -ez-a)
- n is consistently -ez
- a has two allomorphs: -Ø and a templatic affix F
- The class marker is morphologically
  suppressed in the context of -Ø

Stratal Optimization

Input: gentil+ $\left\{ \begin{array}{c} \text{-}\mathbf{F} \\ \text{-}\varnothing \end{array} \right\}$

	PWD=FT$_F$	a=F
☞ a. (gen.til)$_F$		
b. (gen.til)-Ø		*!

Stem Level

Input: (gen.til)$_F$+ez+(a)

	F $\leftrightarrow$ a
☞ a. (genti)$_F$(l-ez-a)	
b. (genti)$_F$(l-ez)	*!

Word Level

Stratal Optimization

Input: maduro+$\left\{ \begin{array}{c} \text{-}\mathbf{F} \\ \text{-}\emptyset \end{array} \right\}$

	PWD=FT$_F$	a=F
☞ a. ma(du.ro)$_F$	*!	
b. ma(du.ro)-Ø		*

Stem Level

Input: (ma.du.ro)+ez+(a)

	F ↔ a
a. (madu)(r-ez-a)	*!
☞ b. (madu)(r–ez)	

Word Level

Alternatives to Phonological Subcategorization

- Lexically indexed constraints (Pater, 2006; this talk) ✔
- Underlying prosodic templates (next slide) ✔
- Cophonologies (Inkelas & Zoll (2005)) *
- Morpheme-specific correspondence (McCarthy & Prince (1994); Benua (1995)) *

Tzeltal by Underlying Prosodic Template

Input: skutʃ+ $\left\{ \begin{array}{c} \text{ɛh} \\ [(\sigma\sigma_{\text{oh}})]_\omega \end{array} \right\}$

	TEMPLATESATISF	MAX	PERF=oh
☞ a. [(sku.tʃoh)]$_\omega$			
b. [(sku.tʃɛh)]$_\omega$			*!

Input: skutʃlaj+ $\left\{ \begin{array}{c} \text{ɛh} \\ [(\sigma\sigma_{\text{oh}})]_\omega \end{array} \right\}$

	TEMPLATESATISF	MAX	PERF=oh
a. [skutʃ.(la.joh)]$_\omega$	*!		
b. [(sku.tʃoh)]$_\omega$		*!**	
☞ c. [(skutʃ.la.jɛh)]$_\omega$			*

Syllable-counting Allomorphy by Cophonologies?

If cophonologies are relativized to morphemes:

their allomorphs cannot have different templates

If cophonologies are relativized to allomorphs:

there can be no competition between allomorphs

⇒ Cophonologies cannot emulate indexed constraints in syllable-counting allomorphy

Morpheme-specific Correspondence

- Would be based on ranking the following constraints: FAITH-BT, FAITH-IO, PWD=BINFT, PERF=oh
- No ranking of these constraints provides the necessary distinctions

Tzeltal by Morpheme-specific Correspondence

Input: skutʃ+{ -ɛh, -oh }

	FAITH-BT	Faith-IO	PWD=BINFT	PERF=oh
a. (sku.tʃ-oh)				
b. (sku.tʃ-ɛh)				*

Input: skutʃlaj+{ -ɛh, -oh }

	FAITH-BT	Faith-IO	PWD=BINFT	PERF=oh
a. skutʃ(la.j-oh)			*	
b. skutʃ(la.j-ɛh)			*	*
c. (sku.tʃ-oh)	***			
d. (sku.tʃ-ɛh)		***		

Summary

- Problematic cases of phonological suppletion follow from indexed constraints + stratal optimization
- Most cases of syllable-counting allomorphy involve bisyllabic foot templates
- Underlying templates are equivalent, cophonologies and morpheme-specific correspondence are not

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