PATTERNS IN POLISH VOWEL~ZERO ALTERNATIONS: EPENTHESIS OR YERS? FOCUS ON NOUNS

JOANNA CHOCIEJ

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0. OVERVIEW

1. INTRODUCTION

1.1. The Problem

(1)	**Alternating nouns**	**Non-alternating nouns**
		Always V
(a)	[lɛv] 'lion' ~ [lvɛm] (Instr. Sg.)	[zlɛv] 'sink' ~ [zlɛvɛm] (Instr. Sg.)
(b)	[pʲɛs]'dog' ~ [psa] (Gen. Sg.)	[bʲɛs] 'devil' ~ [bʲɛsa] (Gen. Sg.)
		Always Ø
(c)	[waska] 'stoat' ~ [wasɛk] (Gen. Pl.)	[waska] 'grace' ~ [wask] (Gen. Pl.)
(d)	[trumna] 'coffin' ~ [trumʲɛn] (Gen. Pl.)	[kɔlumna] 'column' ~ [kɔlumn] (Gen. Pl.)

1.2. Previous analyses: synchronic *yers*

(2) Rubach (1984)
Yer Lowering:
/ĭ/ and /ŭ/ become [e] when followed by a yer in the next syllable
Yer Deletion:
/ĭ/ and /ŭ/ delete in all other cases
pies 'dog' //pĭs+ŭ// [pʲɛs]
psy 'dogs' //pĭs+ɨ// [psɨ]

(3) Gussmann (2007)

Melody Association:

Attach floating [ɛ] to the nucleus when the following nucleus has no melody attached to it.

dech 'breath'

O	N	O	N
|	|	|	|
x	x	x	x
|	⋮	|	
d	ɛ	x	

tchu 'gen. sg.'

O	N	O	N
|	|	|	|
x	x	x	x
|		|	|
d	ɛ	x	u

1.3. Empirical assumptions

Mellander (2000):

- "Since a deletion/vocalization mechanism can account for any observed vowel-zero alternation provided that an underlying *yer* is assumed, standard analyses … have relied exclusively on this mechanism to account for *all* vowel-zero alternations, and consequently have assumed the presence of underlying yers in *all* contexts where vowel-zero alternations occur." (p. 214)
- Doing so results in a simple grammar since there is only one rule. However, it results in a complex lexicon since all *yers* must be inherently encoded.
- Doing so may also be empirically inadequate since it does not take into account phonotactic constraints that may play a role in the distribution of vowel-zero alternations (such as sonority factors in Czech and Slovak).

2. Palatalization effects and neutralization

(4)	dzień 'day'	[dʑɛɲ]	dnia 'gen.sg.'	[dɲa]
	den 'gen.pl.'	[dɛn]	dno 'bottom'	[dnɔ]
	wieś 'village'	[vʲɛɕ]	wsi 'gen.sg.'	[vɕi]
	wesz 'louse'	[vɛʃ]	wszy 'gen.sg.'	[vʃɨ]

- Traditionally necessitated the existence of two *yers*: a front *yer* that caused palatalization on the preceding consonant, and a back *yer* that did not. Gussmann encoded his floating vowels with palatalization features.
- Is this distinction necessary?
- Kochetov (2002): (a) Some underlyingly palatalized consonants surface as plain consonants when in a coda (word-final). (b) In clusters of plain and palatalized consonants, the preceding consonant may get neutralized.
- Kenstowicz (1994: 245):

(5)

	noun	adjectival	
(a)	sekre**t**	secre**t**-n-ɨ	'secret'
	bru**d**	bru**d**-n-ɨ	'dirt'
	ɕa**n**-o	ɕe**n**-n-ɨ	'hay'
(b)	vilgo**tɕ**	vilgo**t**-n-ɨ	'humidity'
	tʂela**dʑ**	tʂela**d**-n-ɨ	'household'
	ko**ɲ**	ko**n**-n-ɨ	'horse'

- I assume that consonants are palatal underlyingly, and that they may lose their palatal feature due to neutralization in pre-consonantal position. This eliminates the need for a distinction between palatalizing and non-palatalizing vowels.

3. ASYLLABIC ROOTS

- Laskowski (1975: 29) points out the existence of asyllabic roots: roots that do not have a constant vowel, i.e. a vowel that does not alternate with zero.
- Need an epenthetic vowel in order to be syllabified.
- Relevant constraints:
  DEP = one violation per every segment present in the output that is not present in the input (i.e. no insertion)
  NUCLEUS[1] = every word/syllable must have at least one vocalic nucleus
- Crucial ranking: NUCLEUS >> DEP
- But where do we insert the epenthetic vowel?

[1] I use this constraint as shorthand for what would in reality be a set of constraints that define syllabification in the language so that every word must have a syllable, and every syllable must have a nucleus, where the nucleus must be a vowel.

3.1. Two-consonant roots

- Further constraints:
  ALIGNR = the right edge of the input must coincide with the right edge of the output
  *COMPLEXCODA = one violation per every segment in a coda beyond one (i.e. codas are only allowed to consist of one segment)
- NUCLEUS >> DEP, *COMPLEXCODA, ALIGNR

Table 1: /lv+Ø/ = [lɛv] = 'lion, Nom. Sg.'

/lv+Ø/	NUCLEUS	DEP	*COMPLEXCODA	ALIGNR
lv	*!			
☞lɛv		*		
ɛlv		*	*!	
lvɛ		*		*!

Table 2: /lv+y/ = [lvy] = 'lion, Nom. Pl.'

/lv+y/	NUCLEUS	DEP	*COMPLEXCODA	ALIGNR
☞lvy				
lɛvy		*!		
ɛlvy		*!		

3.2. Three-consonant roots

- Recall *ComplexCoda is violated when there is more than one consonant in a coda. Therefore the optimal place for vowel insertion would be between the last two consonants.
- NUCLEUS >> DEP, *COMPLEXCODA, ALIGNR

Table 3: /mgʲw+Ø/ = [mgʲɛw] = 'fog, Gen. Pl.'

/mgʲw+Ø/	NUCLEUS	DEP	*COMPLEXCODA	ALIGNR
mgw	*!			
☞mgʲɛw		*		
mɛgw		*	*!	
mgwɛ		*		*!
mɛgʲɛw		**!		

Table 4: /mgʲw+a/ = [mgwa] = ‘fog, Nom. Sg.’

/mgʲw+a/	NUCLEUS	DEP	*COMPLEXCODA	ALIGNR
☞mgwa				
mgʲɛwa		*!		
mɛgwa		*!		

- Note that historically, a yer was present between the first two consonants of [mgwa] ‘fog, Nom. Sg.’. The fact that this shifted may be evidence for the prominence of the *COMPLEXCODA constraint.

4. OBLIGATORY CONTOUR PRINCIPLE AND EPENTHETIC VOWEL PLACEMENT

- However, there are some asyllabic roots that do not exhibit epenthesis between the final two consonants.
- Further constraints needed:
  OCP = coronal fricatives with differing places of articulation cannot appear side by side (i.e. *ʂɕ or *ʐs)
  MAX = one violation per every segment present in the input that is not present in the output (i.e. no deletion)
  IDENT = every segment in the output must be identical to its corresponding segment in the input
- OCP, IDENT, MAX >> *COMPLEXCODA

Table 5: /tʂɛtɕ+Ø/ = [tʂɛɛtɕ] = ‘honour, Nom. Sg.’

/tʂɛtɕ+Ø/	NUCLEUS	OCP	IDENT	MAX	DEP	*COMPLEXCODA
tʂɛtɕ	*!					
tʂɛɛtɕ		*!			*	
☞tʂɛɛtɕ					*	*
tʂʂɛtɕ			*!		*	
tʂɛtɕ				*!	*	

Table 6: /xʐst+Ø/ = [xʐɛst] = ‘baptism, Nom. Sg.’

/xʐst+Ø/	NUCLEUS	OCP	IDENT	MAX	DEP	*COMPLEXCODA
xʐst	*!					
xʐsɛt		*!			*	
☞xʐɛst					*	*
xɛʐst		*!			*	
xʐʂɛt			*!		*	
xʐɛt				*!	*	

- When these words are already syllabified (i.e. have a vocalic suffix), the OCP constraint is satisfied through deletion.

(6) /tʂɛtɕ+i/ → [tʂtɕi] 'honour, Gen. Sg.'
/xzʐst+u/ → [xzʐtu] 'baptism, Gen. Sg.'

- Further constraint needed:
  HEAD-DEP = one violation per every stressed segment in the output that is not present in the input (i.e. bans the stressing and footing of epenthetic segments). Alderete (1999) uses the constraint to account for irregular stress.
  PENULTSTRESS[2] = main stress must be on the penultimate syllable, if not monosyllabic
- HEAD-DEP, PENULTSTRESS >> MAX

Table 7: /tʂɛtɕ+i/ = [tʂtɕi] = 'honour, Gen. Sg.'

/tʂɛtɕ+i/	NUCLEUS	OCP	IDENT	PENULTSTRESS	HEAD-DEP	MAX	DEP
tʂɛtɕi		*!					
tʂɛɛtɕi				*!			*
tʂɛ̲ɛtɕi					*!		*
tʂʂtɕi			*!				*
☞tʂtɕi						*	

Table 8: /xzʐst+u/ = [xzʐtu] = 'baptism, Gen. Sg.'

/xzʐst+u/	NUCLEUS	OCP	IDENT	PENULTSTRESS	HEAD-DEP	MAX	DEP
xzʐstu		*!					
xzʐɛstu				*!			*
xzʐ̲estu					*!		*
xzʐʂtu			*!				*
☞ xzʐtu						*	

[2] I use this constraint as shorthand for what is in reality a set of constraints related to stress, that in combination result in penultimate stress in Polish.

5. Syllabic roots and the Sonority Hierarchy

"Without a synchronic epenthesis rule … Analysis III [where every vowel alternation is the result of an underlying yer] is empirically inadequate; it can account neither for the distributional facts of final consonant clusters, nor for the development of alternating vowels in loanwords in Slovak." (Mellander 2000: 216)

Polish Coda Sonority Hierarchy (using data from Laskowski 1975)**:**

most sonorous
| **sonorants**: [w, n]
| **palatals**: [j, l, n', s', v'] (palatal sonorants and fricatives)
| **obstruents**: stops and non-palatal fricatives
least sonorous

- Further constraint needed:
  Sonority = segments must not increase in sonority away from the nucleus
- Sonority >> Dep

Table 9: /kabl+Ø/ = [kabɛl] = 'cable, Nom. Sg.'

/kabl+Ø/	Sonority	Max	Dep	AlignR
kabl	*!			
☞ka.bɛl			*	
kab.lɛ			*	*!
kal		*!		

Table 10: /kabl+ɛ/ = [kablɛ] = 'cable, Nom. Sg.'

/kabl+ɛ/	Sonority	Max	Dep	AlignR
☞kablɛ				
kabɛlɛ			*!	

6. Exceptions to the Sonority Hierarchy

6.1. Root+Affix edge effects

- [pisk] 'squeal, Nom. Sg.' vs. [pasɛk] 'belt, Nom. Sg.'
  [wask] 'grace, Gen. Pl.' vs. [wasɛk] 'stoat, Gen. Pl.'
  [sk] sequence conforms to the sonority hierarchy

- Nouns that can be decomposed into root + derivational affix often exhibit vowel~zero alternations.
  (a) [-ɛts]~[-ts] ; [-ɛtɕ]~ [tɕ] ; [-ɛk]~[-k] ; [-ɛɲ]~[ɲ]
  (b) [-b]~[-b] ; [-(r/l)ɲ]~[-(r/l)ɲ]
  (c) [-izn]~[-izn] ; [-isk]~[-isk] ; [-ɔɕtɛ]~[-ɔɕtɛ]
- Certain types of derivational affixes have an underlying vowel that gets deleted when the affix is followed by another vowel.

- Conjunct constraint:
  [STW & *StressAffix]
  Stress-to-Weight[3] = unmarked vowels should not be stressed
  *StressAffix = affixes should not be stressed
- [STW & *StressAffix] >> Max >> STW, *StressAffix
- Individually, unmarked vowels may be stressed when not in an affix:
  dzɻ̱ɛv-ɔ ‘tree/wood, Nom. Sg.’
  ɕɛkʲɻ̱ɛr-a ‘axe, Nom. Sg.’
  And vowels in affixes may be stressed when they are not unmarked:
  lɔdɔw-i̱sk-ɔ ‘ice rink, Nom. Sg.’
  vɨsɔk-ɔ̱ɕtɛ-i ‘height, Nom. Pl.’

Table 11: /was+ɛk+Ø/ = [wasɛk] = ‘stoat, Gen. Pl’

/was+ɛk+Ø/	[STW & *StressAffix]	PenultStress	Sonority	Max
wask				*!
wasɛ̱k	*!	*		
☞ wa̱sɛk				

Table 12: /was+ɛk+a/ = [waska] = ‘stoat, Nom. Sg.’

/was+ɛk+a/	[STW & *StressAffix]	PenultStress	Sonority	Max
☞wa̱ska				*
wasɛ̱ka	*!			
wa̱sɛka		*!		

Table 13: /wask+Ø/ = [wask] = ‘grace, Gen. Pl’

/wask+Ø/	[STW & *StressAffix]	PenultStress	Sonority	Max
☞wask				

[3] This constraint is used with the assumption that [ɛ] is the unmarked vowel, as evidenced by its status as the epenthetic vowel, and that it is monomoraic, whereas other vowels in the system are bimoraic (Bethin 1998).

Table 14: /wask+a/ = [waska] = ‘grace, Nom. Sg.’

/wask+a/	[STW & *StressAffix]	PenultStress	Sonority	Max
☞waska				

6.2. Contiguity in affixes

- [bwazɛn] ‘fool, Nom. Sg.’ vs. [biɛlizn] ‘undergarment, Gen. Pl.’
  [zn] sequences do not conform to the sonority hierarchy and normally have vowels between them word-finally, but not when they are part of the derivational suffix *–(i)zna*.

- New constraint needed:
  DepAffix = one violation per every segment present in the output of an affix that is not present in the input (i.e. no insertion in affixes)
- DepAffix >> AlignR >> Sonority

Table 15: /bwazn+Ø/ = [bwazɛn] = ‘fool, Nom. Sg.’

/bwazn+Ø/	DepAffix	AlignR	Sonority	Dep
bwazn			*!	
bwaznɛ		*!		
☞bwazɛn				*

Table 16: /bʲɛl+izn+Ø/ = [bʲɛlizn] = ‘undergarment, Gen. Pl.’

/ bʲɛl+izn +Ø/	DepAffix	AlignR	Sonority	Dep
☞bʲɛlizn			*	
bʲɛliznɛ		*!		*
bʲɛlizɛn	*!			*

6.3. Native vs. Borrowed vocabulary

- Kiparsky (1982: 132) on diacritic features: “Features like [± Foreign] have seemed more appropriate because loanwords are characteristically exceptions not just to one rule, but to a large number of rules, and tend to fall into classes exhibiting similar behavior.”
- New constraint needed:
  DepForeign = one violation per every segment present in the output of a word of foreign origin that is not present in the input (i.e. no insertion in foreign origin words)
- Crucial ranking: DepForeign >> AlignR >> Sonority

Table 17: Native vocabulary: /trumn+Ø/ = [trumʲɛn] = ‘coffin, Gen. Pl.’

/trumn+Ø/	DepForeign	AlignR	Sonority	Dep
trumn			*!	
trumnɛ		*!		*
☞trumʲɛn				*

Table 18: Borrowed vocabulary: /kolumn+Ø/ = [kolumn] = ‘column, Gen. Pl.’

/kolumn+Ø/	DepForeign	AlignR	Sonority	Dep
☞kolumn			*	
kolumnɛ		*!		*
kolumʲɛn	*!			*

6. Conclusion

Full constraint rankings:

(1) Head-Dep, PenultStress, [STW & *StressAffix], OCP, Ident >> Max >> *ComplexCoda

(2) DepAffix, Dep Foreign >> AlignR >> Sonority >> Dep

(3) Nucleus >> Dep

- The constraint rankings, in conjunction with the Sonority Hierarchy for Polish Codas, can account for most instances of vowel~zero alternations in Polish nouns.

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