Tobias Scheer
CNRS 7320, Université Nice Sophia Antipolis
scheer@unice.fr

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this handout and some of the references quoted at
http://sites.unice.fr/scheer

VOWEL-ZERO ALTERNATIONS IN SLAVIC: HAVLIK AND LOWER PATTERNS

(1) purpose
   a. to provide a survey of the workings of vowel-zero alternations
   b. to identify
      1. what's shared and
      2. what's different: loci of variation
   c. to show that Lower is a regressive lateral relation between two vowels
   d. to show that yers are not specifically Slavic
   e. to recall that insertion analyses ignore the facts today as much as in the 1980s

1. Common Slavic yers and modern alternating vowels

(2) CS yers and modern alternating vowels are entirely independent
   a. the loss of CS yers was the initial spark of vowel-zero alternations in Slavic languages, but
   b. it is neither true that they all modern vowels that alternate with zero go back to a CS yer,
   c. nor that all CS yers have produced modern alternating vowels
   d. ==> there can be no doubt that we are facing a phenomenon that is perfectly active in synchronic grammar

(3) non-etymological yers

a. examples from Czech, where (at least) two rounds of epenthesis occurred (all diachronically epenthetic vowels alternate with zero in the modern language)

1. epenthesis in Old Czech			2. epenthesis in Modern Czech			
CS	Old Cz	gloss	CS	Old Cz	Mod. Cz	gloss
ogn-ь	oh**e**ň	fire Nsg	vydr-ъ	vydr	vyd**e**r	otter Gpl
od-	od(**e**)-	from	sestr-ъ	sestr	sest**e**r	sister Gpl
orz-	roz(**e**)-	separating, inchoative	stьbl-ъ	stébl	stéb**e**l	blade Gpl
bez-	bez(**e**)-	without	kridl-ъ	křídl	kříd**e**l	wing Gpl

b. examples from Russian

1. epenthesis of alternating vowels

Kiparsky (1967:120f)

CS	Russian		gloss
ogn-ь	ogón'	ogn'-á	fire Nsg, Gsg
ǫglь	úgol'	ugl'-á	coal Nsg, Gsg

2. non-alternating > alternating vowel

Kiparsky (1963:95)

ledъ	l'ód	l'd-á	ice Nsg, Gsg

(4) CS yer > stable vowel

a. examples from Czech

Trávníček (1935:48)

CS	Czech		gloss
blъch-a	blech-a		flea Nsg
bъzъ	bez	bez-u	elder (bot.) Nsg, Gsg

b. examples from Russian

Kiparsky (1963: 95f, 1967:117)

CS	Russian		gloss
sъtъ	sót	sót-a	honeycomb Nsg, Npl
rъpъtъ	ropot	ropot-a	murmur of discontent Nsg, Gsg
tъpъtъ	topot	topot-a	tram of feet Nsg, Gsg

(5) alternating vowels in non-native vocabulary

a. the decision to break up a cluster by an epenthetic (and alternating) vowel or not is made upon the lexicalization of new vocabulary items, and this produces a random distribution of alternating vowels.

b. children that acquire their native tongue have no way to know whether the cluster of something that they hear as *swetr-a* "jumper Gsg" in Polish or *metr-o* "metro Nsg" in Czech will or will not break up until they have a chance to hear the word without the final vowel. Relevant mislexicalizations are indeed typical "mistakes" that are reported from children.

c. identical clusters are sometimes broken up by epenthesis, at other times remain untouched

Czech			
rt	kart-a	karet	card Nsg, Gpl
	kvart-a	kvart	quart Nsg, Gpl
Polish			
tr	sweter	swetr-a	jumper Nsg, Gsg
	filtr	filtr-a	filter Nsg, Gsg

d. alternating vowel borrowed?

1. sometimes such a vowel may be suspected
   pol. sweter, puder < engl. sweter, germ. Pude*r*
2. but at other times there is no vowel in the donor language that could have been borrowed:

Czech		
kart-a	karet	card Nsg, Gpl
palm-a	palem	palm (tree) Nsg, Gpl
farm-a	farem	farm Nsg, Gpl
metr-o	meter	metro Nsg, Gpl
bistr-o	bister	kind of bar Nsg, Gpl
makr-o	maker	(computer) macro Nsg, Gpl

2. Empirical generalizations

(6) property #1, shared by all Slavic languages
whether a vowel alternates with zero or not cannot be predicted from its phonetic, contrastive or morphological properties.

alternating and non-alternating vowels of the same quality

	alternating		non-alternating		
	CvC	CøC-V	CvC	CvC-V	gloss
Russian	kusók	kusøk-á	rabót	rabót-a	piece Nsg, Gsg; work Gpl, Nsg
Polish	pies	pøs-a	bies	bies-a	dog Nsg, Gsg; devil Nsg, Gsg
Czech	lev	løv-a	les	les-a	lion Nsg, Gsg; forest Nsg, Gsg
BCS	tajac	tajøc-a	pajac	pajac-a	silence Nsg, Gsg; clown Nsg, Gsg

(7) consequence: alternating vowels must be lexically distinct

a. analyses must be able to somehow distinguish "true" (i.e. stable) from "false" (i.e. alternating) vowels of the same quality.

b. this is true for all morphemes: alternating vowels freely occur across prefixes, roots and suffixes.

(8) related question
are alternating vowels underlyingly absent and inserted, or present and deleted?

a. insertion-based analyses:
epenthesis occurs in order to break up "difficult" or ill-formes consonant clusters.
Laskowski (1975), Czaykowska-Higgins (1988) and Piotrowski (1992).

b. they are convincingly refuted by Gussmann (1980:26ff), Rubach (1984:28f, 1993: 134ff) and Szpyra (1992:280ff, 1995:94ff):

c. because no context for insertion can be stated (alternating vowels are unpredictable…)

Polish (Rubach 2013: 1141)

1.	st	oset	ost-u	thistle Nsg, Gsg
		most	most-u	bridge Nsg, Gsg
2.	rk	korek	kork-a	cork Nsg, Gsg
		bark	bark-u	shoulder Nsg, Gsg
3.	tr	sweter	swetr-a	sweater Nsg, Gsg
		Piotr	Piotr-a	Peter Nsg, Gsg

Russian

1.	sk	lások	lásk-a	weasel Gpl, Nsg
		lásk	lásk-a	caress Gpl, Nsg
2.	br	bob'ór	bobr-á	beaver fur Gpl, Nsg
		bóbr	bobr-á	beaver Nsg, Gsg

d. also in languages where more than one vowel alternates with zero (Eastern Slavic), speakers would not know which vowel to insert.

Russian

e	d'én'	dn'-á	day Nsg, Gsg
o	són	sn-á	dream Nsg, Gsg

(9) Russian
yer quality is not predictable from the consonantal environment (palatal vs. non-palatal)

	ó		é		
C__	són	sn-á	vengérk-a	véngr	sleep Nsg, Gsg; Hungarian woman, Hungarian
C'__	l'ón	l'n-á	p'en'	pn'-a	linen Nsg, Gsg; stump Nsg, Gsg
__C	l'ód	l'd-á	chrebét	chrebt-á	ice Nsg, Gsg; spine Nsg, Gsg
__C'	ogón'	ogn'-á	seméj	semj-á	fire Nsg, Gsg; family Gpl, Nsg

(10) insertion keeps coming back

a. although the data and arguments are known: authors like Yearley (1995) and Gouskova (2012) either ignore the facts or acknowledge them but don't mind anyway. See the eloquent refutation of Gouskova (2012) by Rubach (2013).

b. Gouskova (2012: 83)
"In some cases, however, the presence of the underlined vowel is obligatory: without it the cluster would be unpronounceable":
- pk# chlópok - chlopk-e "cotton Nsg, Lsg" *chlópk
- tk# korótok - korotk-á "short, masc., fem" *korótk

c. she does not explain what "unpronounceable" means: there is no physiological, phonetic, muscular, psychological or other obstacle that would prevent Russians (or speakers of any other language for that matter) to pronounce -pk#, -tk#.

d. the fact that Russian does not happen to have word-final -pk#, -tk# (or other clusters for that matter) is irrelevant, since the vowel-zero alternation behaves exactly in the same way when the alternative word-final clusters do exist, see (8).
Cases like under (8) are ignored: there is no way to know in which word epenthesis occurs (/lásk/ → lások) and which word ends up with a final cluster (/lásk/ → lásk).

e. the only thing that matters is whether or not the stem-final cluster accommodates a yer: the surfacing of the vowel is predictable from the context (Lower).

f. this simple statement covers *all* situations.
Not invoking it is missing an obvious generalization, and creates the illusion of multi-causality where a single mechanism is at work.

g. Gouskova (2012) believes that there are three different reasons why alternating vowels appear on the surface in Russian:
1. they stand in closed syllables /lask/ → lások "weasel Gpl"
2. avoid an "unpronounceable" coda cluster /chlopk/ → chlópok "cotton Nsg"
3. every syllable must be headed by a vowel /sn/ → són "dream"

(11) property #2
distribution of vocalized and unvocalized alternation sites

a. first approximation:
V in closed, zero in open syllables

	open syllable	closed syllable		gloss
	C__C-V	C__C-ø	C__C-CV	
Russian	vojøn-á	vójen	vojén-nɨj	war NOMsg, GENpl, adj.
Czech	lokøt-e	loket	loket-ní	elbow GENsg, NOMsg, adj.
Polish	wojøn-a	wojen	wojen-ny	war NOMsg, GENpl, adj.

b. BUT: vowels also occur in open syllables (grey-shaded column)

	open syllable		closed syllable	
	zero	vowel	vowel	vowel
	C__C-V	C__C-yer Cø	C__C-ø	C__C-CV
Russian	dn'-á	d'en'-ók	d'én'	d'en'-øk-á
Czech	dom-øk-u	dom-eč-ek	dom-ek	dom-eč-øk-u
Slovak	kríd-øl-o	kríd-el-iec	kríd-el	kríd-el-øc-e
Polish	buł-øk-a	buł-ecz-ek	buł-ek	buł-ecz-øk-a
BCS	lakøt-a	lakat-an (lakat-øn-og Gsg)	lakat	–

(12)

Empirical generalization
Alternation sites are vocalized in open syllables iff the following vowel alternates with zero.

(13) **the yer context**
alternation sites show

V / __	C.CV C# C ь,ъ	in closed syllables before yers	buł-**e**cz-k-a buł-**e**k buł-**e**cz-ek
ø / __	CV	iff V ≠ ь,ъ	buł-**ø**k-a

(14) challenge
disjunction
what do closed syllables and alternating vowels have in common?

3. Lower

(15) reducing the disjunction
a. is not possible by making reference to closed and open syllables
b. is possible by generalizing the other side of the disjunction:
alternation sites are vocalized iff they are followed by an alternating vowel
c. ==> this is the insight of Lower
Lightner's (1965)
d. Lower
ĭ,ǐ → e,o / __C_0 {ĭ,ǐ}
where the two input symbols are two distinct vowels, called yers, which never appear on the surface as such (they are absolutely neutralized)

(16) consequence: abstract vowels
a. all consonant-final words are assumed to end in a yer. /pĭsĭ/ → pes
These final yers are interpreted as case markers.
b. all consonant-initial suffixes are assumed to begin with a yer /lokĭt-ĭní/ → loket-ní
c. distribution of abstract vowels:
1. after word-final consonants
2. in places where vowels alternate with zero

(17) cyclic application

a. Lower must apply following the morphological structure, i.e. inside-out
[[[[buł] **ĭ**k] **ĭ**k] **ĭ̆**]

b. /buł-**ĭ**k-**ĭ**k-**ĭ̆**/

1. computation of buł	nothing happens
2. computation of buł-**ĭ**k	nothing happens
3. computation of buł-**ĭ**k-**ĭ**k	Lower applies → buł-Ek-**ĭ**k
4. computation of buł-**ĭ**k-**ĭ**k-**ĭ̆**	Lower applies → buł-Ek-Ek-**ĭ**

5. final yers are deleted

c. cyclic application: Lightner (1965:111f), Pesetsky (1979), Rubach (1984:184ff)

d. non-cyclic version of Lower
Anderson (1974), Gussmann (1980, 2007)
"the string is first scanned for the [alternating] segments; once these are identified, the change is implemented simultaneously" (Gussmann 1980:30)

4. Autosegmental version of Lower

(18) underlying identity

a. recall that alternating vowels must be lexically distinct from non-alternating vowels of the same quality.

b. linear solution: two vowels added to the inventory
ĭ **ĭ̆**
properties: high vowels
[-tense] in order to distinguish them from other high vowels
[+banana] would have had the same motivation.
Except the reminiscence to Common Slavic yers, which were high vowels.

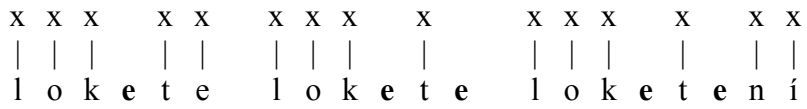
(19) autosegmental solution
Hyman (1985:58f), Rubach (1986), Kenstowicz & Rubach (1987)

a. the distinction is structural, rather than melodic

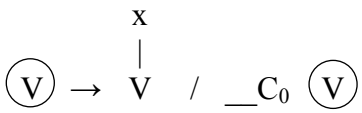
b. alternating vowels are floating pieces of melody

Czech "elbow"

a. lokøt-e Gsg b. loket Nsg c. loket-ní adjective



(20) autosegmentalised Lower
an x-slot is associated to a floating vowel if that vowel is followed by another floating vowel.

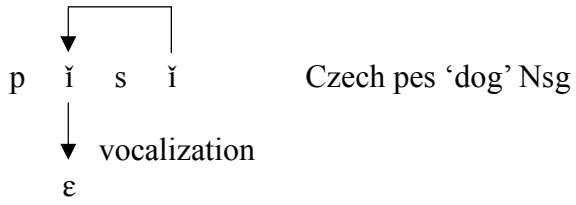


(21) advantages
  a. no need for extra vowels
  b. that are absolutely neutralized
  c. no need for invented properties such as [-tense]
  d. no need for a yer deletion rule: non-associated pieces of melody remain unpronounced
  e. no limitation of the number of alternating vowels
     Lightner's yers could produce only two distinct vowels that alternate with zero.
     But there are languages with three or more alternating vowels, e.g. Slovak (Rubach 1993: 139ff).

5. Lower, empty nuclei and government

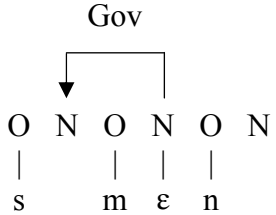
(22) Lower describes a lateral relation
  a. the only information which is needed in order to compute the phonetic value of alternation sites concerns the following vowel,
     1. which is either a yer (i.e. a floating piece of melody) ==> vocalization
     2. or a non-yer (an associated piece of melody). ==> non-vocalization
  b. basic insight of Lower:
     vowel-zero alternations are the result of a regressive (right-to-left) intervocalic relationship: the patient is the leftmost vowel, whose phonetic value is determined by its neighbor to the right.

(23) Lower describes a lateral and regressive relationship between vowels



Czech pes ‘dog’ Nsg

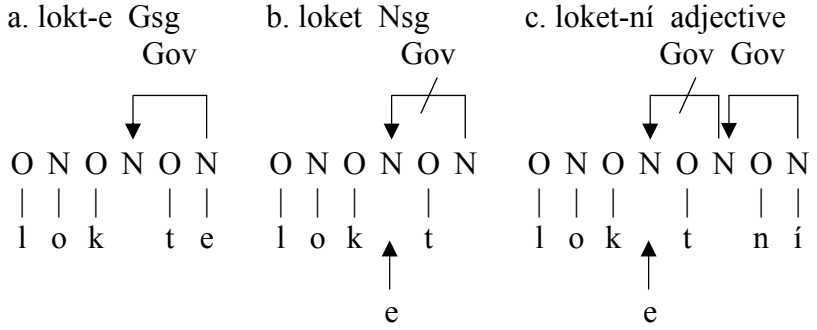
(24) empty nuclei
  a. Anderson (1982) on French schwa
  b. Spencer (1986) on Polish vowel-zero alternations
  c. Government Phonology
     Kaye *et al.* (1990), Kaye (1990a)
     1. empty nuclei were not invented by GP, but they are a trademark of that theory because it gave them a theoretical status with stable cross-linguistic properties.
     2. distribution of empty nuclei:
        - after the last consonant of consonant-final words
        - in places where vowels alternate with zero
     3. e.g. French *la semaine* "the week" may be pronounced [la səmɛn] or [la smɛn]



French *la semaine* [la smɛn]

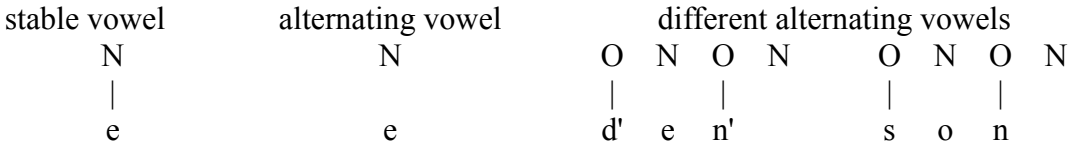
d. **Government**
schwa is deleted under the influence of government, a lateral force which originates in the following vowel and is always regressive (right-to-left).
e. the distribution of empty nuclei in GP is exactly the one of abstract vowels (yers), cf. (16)c.
f. multigenesis
GP didn't know about Slavic, and Lighter, Rubach etc. wrote before GP was born.

(25) alternating vowels are empty nuclei: Gussmann & Kaye (1993)
Czech "elbow"

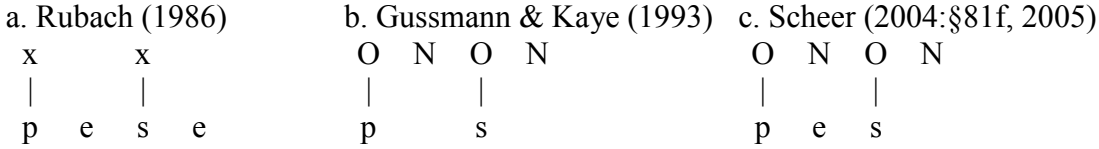


(26) Kaye & Gussmann (1993):
insertion and deletion at the same time
a. deletion
empty nuclei are present lexically, but may be silenced (by government)
b. insertion
empty nuclei acquire melody through epenthesis (in case they escape government)
c. insertion of melody is impossible in languages where two distinct vowels alternate with zero (East Slavic): one would not know which vowel to insert.

(27) nuclei cum melody
a. lexical identity of alternating vowels
both nuclei and melody are present, but they are not associated.



b. government acts as an association-inhibitor: floating melodies associate by default except when their nucleus is governed.



6. Lower vs. Havlík

(28) Lower vs. Havlík
in a sequence of alternating vowels,
a. all alternating vowels in a row are vocalized ==> Lower
MoCz /domEčEk/ appears as *domečeк*
recall the grey-shaded column under (11)b
b. every other alternating vowel vocalizes ==> Havlík
(counting from the right edge)

(29) Havlík's Law
sound law discovered by Antonín Havlík (1889) for Old Czech
a. in a sequence of consecutive yers in CS, every other yer appears in OCz, counting from the right edge.
b. se psem 'with the dog'
4 3 2 1 4 ȝ 2 ѵ
CS sъ pьs-ъmь > OCz se pøs-emø

(30)

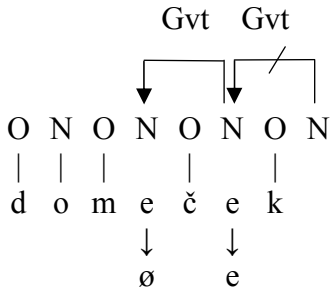
	open syllable		closed syllable	
	a. zero C__C-V	b. vowel/zero C__C-yer C	c. vowel C__C#	d. vowel C__C-CV
Czech Mod.	dom-**ø**k-u	dom-**e**č-ek	dom-**e**k	dom-**e**č-øk-u
Old		dom-**ø**č-ek		
Polish Mod.	pies-**ø**k-a	p**ie**s-ek	p**ie**s	p**ie**s-øk-a
Old		p**ø**s-ek		

(31) Havlík outside of Slavic
a. Moroccan Arabic (Kaye 1990b)
b. German (e.g. Hall 1992, Noske 1993)
c. French
Scheer (2004:§469) and Schenker (1995:97) are explicit on the Slavic-French parallel.

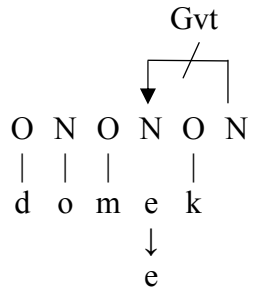
(32) Lower must be directional
Scheer & Ziková (2010)
a. recall from (17) that Lower needs to be applied cyclically
b. Havlík is simply the non-cyclic application of Lower (government)
c. the Lower rule by itself is non-directional: it does not provide any indication whether a string should be computed from right to left, from left to right or in some other way.
Rubach (1984:190)
d. government is intrinsically directional: it applies from right to left.
e. government also has the following restriction:
only phonetically expressed nuclei are good governors.

(33) Havlík vs. Lower

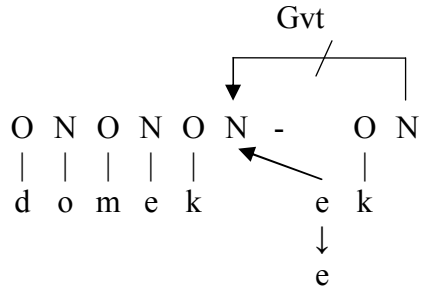
a. Havlík
computation of the string in one go



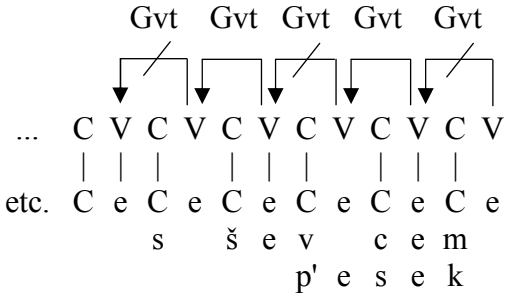
b. Lower
cyclic computation
1. inner cycle



2. outer cycle



(34) Havlík: more illustration



OCz sø ševøcemø < *sъ šьv-ьc-ьmь
Old Polish pøs-ek "dog dim. Nsg"

7. Yers and Lower are not specifically Slavic

(35) classical view

a. yers are Common Slavic vowels and hence exist only exist in Slavic.
b. therefore vowel-zero alternations in Slavic have got nothing to do with vowel-zero alternations in other languages.
c. in linear approaches, alternating vowels were represented as idiosyncratic melodic items in the underlying vocalic inventory - a specific fact about Slavic.

(36) analysis has made yers unspectacular and common
   a. only Slavic languages have [–tense] yers, but all languages can have floating pieces of melody.
   b. Government-based analyses have gone one step further: the lateral relation embodied by Lower identifies as government, and word-final consonants are followed by an empty nucleus, rather than by a yer with morphological value.
   c. vowels that alternate with zero in modern Slavic languages are perfectly independent from the Common Slavic vowels that are known as yers (see section 1).
   d. the phenomena at hand are not specifically Slavic, but phonological in nature.

(37) the yer context
   "in closed syllables and before a vowel that alternates with zero"
   a. controls phenomena in Slavic beyond vwoel-zero alternations.
   b. controls alternations beyond Slavic.

(38) Western Slavic
Scheer (2004:§428)

	open syllable		closed syllable	
	C__C-V	C__C-yer	C__C#	C__C-CV
a. Czech VV-V	ž**á**b-a	ž**a**b-ek	ž**a**b	ž**a**b-øk-a
	jm**é**n-o		jm**e**n	jm**e**n-ný
b. Czech o-ů	n**o**ž-e	n**ů**ž-ek	n**ů**ž	n**ů**ž-øk-y
c. Polish o-ó	kr**o**v-a	kr**ó**v-ek	kr**ó**v	kr**ó**v-øk-a
d. Polish ę-ą	zęb-a	z**ą**b-ek	z**ą**b	z**ą**b-øk-a

(39) French
ATR alternations of mid vowels
Scheer (2004:§437)

	closed syllable		open syllable		
	__C#	__C.CV	__Cə	__CV	spelling
e	f**ɛ**t	al**ɛ**χte	s**ɛ**ləʁi	f**e**te	je fête, alerter, céleri, fêter
	m**ɛ**tχ	p**ɛ**ʁdy	b**ɛ**təʁav	m**e**tχik	mètre, perdu, betterave, métrique
	səʁ**ɛ**n		səʁ**ɛ**nəmã	seʁ**e**nite	sereine, sereinement, sérénité
o	k**ɔ**d	p**ɔ**χte	m**ɔ**kəʁi	k**o**de	code, porter, moquerie, coder
	r**ɔ**z	n**ɔ**ʁmal	r**ɔ**zəʁɛ	r**o**zje	rose, normal, roseraie, rosier
	s**ɔ**bʁ		s**ɔ**bʁəmã	s**o**bʁijete	sobre, sobrement, sobriété
ø	øʁ**œ**z	**œ**χte	øʁ**œ**zəmã	ap**ø**ʁe	heureuse, heurter, heureusement, apeuré
	œvʁ	s**œ**χfe	b**œ**vəʁi	**ø**vʁe	œuvre, surfer, beuverie, œuvrer
	ʒ**œ**n		v**œ**ləʁi	ʒ**ø**nɛs	jeune, veulerie, jeunesse

(40) French
schwa - [ɛ] alternation
Scheer (2004:§439)

closed syllable	open syllable		
ɛC#	ɛCə	əCV	spelling
mɔχsɛl	mɔχsɛləmã	mɔχsəlɔ̃, mɔχsəle	je morcèle, morcèlement, nous morcelons, morceler
apɛl	apɛləʁa	apəle	j'appelle, appellera, appellation
ãsɔχsɛl	ãsɔχsɛləmã	ãsɔχsəle	j'ensorcèle, ensorcèlement, ensorceler
aχsɛl	aχsɛləmã	aχsəle	je harcèle, harcèlement, harceler
aʃɛv	aʃɛvəmã	aʃəve	j'achève, achèvement, achever
sɛvʁ	sɛvʁəʁa	səvʁe səvʁaʒ	je sèvre, sèvrera, sevrer, sevrage

(41) German
distribution of [ŋ] and [ŋg] in monomorphemic environments
Scheer (2004:§482)
See also Dutch (Kager & Zonneveld 1986)
a. occurrence of [ŋ]

__#		__C		__ə	
[ ]	spelling	[ ]	spelling	[ ]	spelling
laŋ	lang	ʔaŋst	Angst	ʔɪŋə	Inge
dʁaŋ	Drang	pɪŋpɔŋ	Pingpong	ʔaŋəl	Angel
dɪŋ	Ding	hɛŋst	Hengst	fɪŋɐ	Finger
ʔɛŋ	eng	ʔaŋʃtχøm	Angström	maŋəl	Mangel
ʁɪŋ	Ring	bɛŋt	Bengt	hʊŋɐ	Hunger
				bɛŋəl	Bengel

b. occurrence of [ŋg]

__V	
[ ]	spelling
ʔɪŋgoo	Ingo
taŋgoo	Tango
ʔaŋgiinaa	Angina
zɪŋgʊlaa	Singular
ʔʊŋgaan	Ungarn
ʔɛfaŋgeelɪʃ	evangelisch
ʔaŋgeelɪka	Angelika

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