

Bisyllabicity and Prosodic Domains

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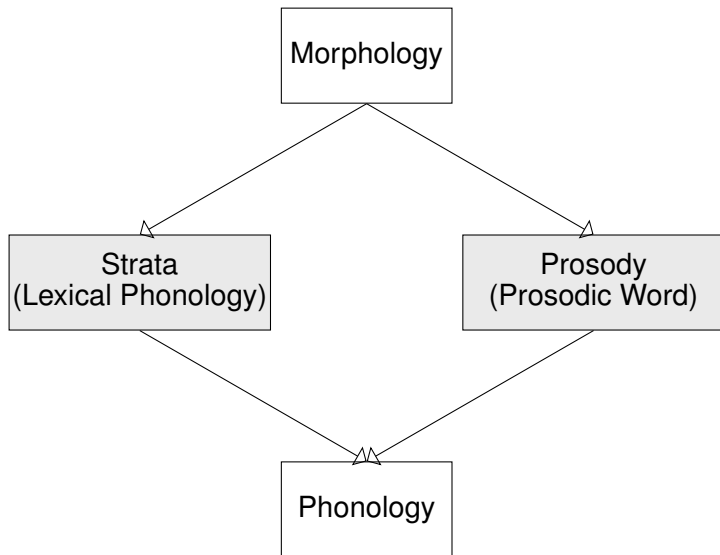
Prosodic Alignment at the Word Level
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What is a Prosodic Word?

A set of morphological boundary symbols
the grammar makes visible to phonology

(Scheer, 2008; Neeleman and van de Koot, 2006)

The Dual-Route Model of Nespov & Vogel (1986)



Goal of this Talk

Explore whether PWords can be replaced by Strata

Empirical Domain

Phonological processes where

bisyllabic affixes seem to behave as PWords,

while monosyllabic affixes don't

Roadmap

Strata

Ngalakan Word Stress

Yidj Penultimate Vowel Lengthening

Hungarian Vowel Harmony

Traditional Stratal OT (Kiparsky, 2000)

- ▶ (At the root level,
only roots undergo phonological evaluation)
 - ▶ At the stem level,
only stems undergo phonological evaluation
 - ▶ At the word level,
only words undergo phonological evaluation
- Affixes never undergo phonological evaluation on their own

Egalitarian Stratal OT (Bermudez-Otero, 2008)

A derivation of a word is based on a lexical array
(the set of all roots and affixes to be part of the word)
which are successively combined

At every level all maximal morphological objects
undergo phonological evaluation

(i.e. all morphological objects
which are not part of other morphological objects)

Egalitarian Stratal OT (Bermudez-Otero, 2008)

	Phonological Evaluation of
(Morpheme Level:	Roots and affixes)
Stem Level:	Stems and word-level affixes
Stem Level:	Words

Egalitarian Stratal OT (Bermudez-Otero, 2008)

	Phonological Evaluation of
Lexical Array:	stupid, -ity, -s
Stem Level:	stupidity, -s
Word Level:	stupidities

Ngalakan Word Stress

Bisyllabic Affixes seem to behave like independent PWords
with respect to stress assignment

(Baker,2005)

Ngalakan: Alternating Stress (Baker,2005)

- a. (pólo) 'old person'
- b. (káma)la 'sky'
- c. (káŋa)(mùru) 'long-nose' (native honeybee)
- d. (káɹaŋ)(kàna)(ŋìni) 'wallaby sp.'

Ngalakan: Morphologically Disrupted Stress (Baker,2005)

- a. (tʰótoyʔ)-ki ‘aunt-your’
- b. (tʰótoyʔ)-(kí-kkaʔ) ‘aunt-your-LOC’
- c. (tʰótoyʔ)-ki-p(púlu) ‘aunt-your-PL’
- d. (tʰótoyʔ)-ki-p(púlu-k)kaʔ ‘aunt-your-PL-LOC’

Generalization

“Polysyllabic suffixes and clitics are inherently footed, but the footing of monosyllabic suffixes and clitics is contingent on their surrounding environment.”

(Baker,2005:5)

Basic Analysis


- ▶ **Stem Level:** Foot structure is built on stems and bisyllabic word-level affixes, but not on monosyllabic affixes
- ▶ **Word Level:** Stem-level foot structure must be maintained
New feet can only be built on hitherto unfooted syllables

Prosodic Constraints


AL-FT	The left edge of every foot should be aligned to the left edge of a word
AL-WD	The left edge of every word should be aligned to the left edge of a foot
FT-BIN	Feet should be binary
PS-σ	Every syllable should be dominated by a foot node
PS-SEG	Every segment should be dominated by a syllable node

Stem Level: Roots

Input: kaŋamuru

	PS-SEG	FT-BIN	PS- σ	AL-FT
 (káŋa)(mùru)				**
(káŋa)mùru			*!*	
(ká)(ŋa)(mù)(ru)		*!		*****
kaŋamuru	*!*****			

Input: kamala

	PS-SEG	FT-BIN	PS- σ	AL-FT
 (káma)la			*	
ka(mála)			*	*!
(káma)(lá)		*!		**
kamala	***!***			

Stem Level: Affixes

Input: -ppulu

	PS-SEG	FT-BIN	PS- σ	AL-FT
☞ (ppulu)				
<u>ppulu</u>			*!*	
ppulu	*!****			

Input: -ŋki

	PS-SEG	FT-BIN	PS- σ	AL-FT
(ŋki)		*!		
☞ <u>ŋki</u>			*	
ŋki	*!***			

Prosodic Faithfulness Constraint

F_{TH}-F_T

Syllables which are dominated by a foot F in the input should be dominated by a foot corresponding to F in the output

Word Level: Complex Forms

Input: (tótóyʔ)-ki-kkaʔ

	FTH-FT	PS-SEG	FT-BIN	PS- σ	AL-FT
☞ (tótóyʔ)-(kí-kkaʔ)					**
(tótóyʔ)- <u>ki-kkaʔ</u>				*!*	
(tótóyʔ)-(ki)-(kkaʔ)			*!		*****

Input: (tótóyʔ)-ki-p(púlu)

	FTH-FT	PS-SEG	FT-BIN	PS- σ	AL-FT
☞ (tótóyʔ)- <u>ki-p(púlu)</u>				*	**
(tótóyʔ)-(ki-p)(púlu)			*!		**
(tótóyʔ)-(ki-ppu) <u>lu</u>	*!			*	

Yidj Penultimate Vowel Lengthening

Bisyllabic suffixes seem to behave as independent PWords

regarding a process which lengthens the penultimate syllable

of a word with uneven syllable number

Penultimate Vowel Lengthening in Bare Roots

Bisyllabic Roots

mú.ɖam ‘mother’ (abs.)

gá.liŋ ‘go’ (pres.)

Trisyllabic Roots

gu.dá:ga ‘dog’

maɖi:n.daŋ ‘walk up’

Penultimate Vowel Lengthening in Affixed Words

Bisyllabic Words

gú.da.gá-gu 'dog' (purp.)

3- or 5-syllabic Words

ga.lí:-na 'go' (purp.)

ŋu.naŋ.ga.ra:-n.da 'whale' (dat.)

Disruption by Bisyllabic Syllables

ma.dj:n.da.-ŋa.lin 'walk up (pres.)'

gu.má:ri.-da.gá:.-ŋu 'to have become red'

Yidj Penultimate Vowel Lengthening

The penultimate vowel of a Prosodic Word with uneven syllable number is lengthened

Bisyllabic Suffixes start new Prosodic Words

(Nespor & Vogel, 1986:34-35,134)

Basic Analysis

- ▶ **Stem Level:** Feet are built on stems and bisyllabic word-level affixes, but not on monosyllabic affixes
- ▶ **Word Level:** Stem-level foot structure must be maintained
New feet can only be built on hitherto unfooted syllables

**Lengthening applies to stressed syllables
if these precede an unfooted syllable**

Yidj: Stem-Level Footing – Roots

Input: mudam, ‘mother’

	FT-BIN	PS- σ
☞ (mu.dam)		
<u>mu.dam</u>		*!*
(mu).dam	*!	*

Input: gudaga, ‘dog’

	FT-BIN	PS- σ
☞ (gu.da)ga		*
<u>gu.da.g</u> a		**!*
(gu.da)(ga)	*!	
(gu).da.ga	*!	**

Yidj: Stem-Level Footing – Affixes

Input: -daga, ‘inchoative’

	FT-BIN	PS- σ
☞ (da.ga)		
<u>da</u> .ga		*!*
(da). <u>ga</u>	*!	*

Input: -gu, ‘purposive’

	FT-BIN	PS- σ
(gu)	*!	
☞ <u>gu</u>		*

Yidj: More Prosodic Constraints

No-FIN	Words should not end in stressed syllables
*CLASH	Avoid adjacent stressed syllables
IAMB	Feet should be iambic

Yidj: Word-Level Footing

Input: (mu.dam), 'mother'

	FTH-FT	FT-BIN	NO-FIN	*CLASH	IAMB
☞ (mu.dam)					*
(mu.dam)			*!		
<u>mu.dam</u>	*!				

Input: (mu.dam)-gu, 'mother-purposive'

	FTH-FT	FT-BIN	NO-FIN	*CLASH	IAMB
☞ (mu.dam)-gu					
(mu.dam)-gu					*!
(mu.dam)-(gu)		*!	*		
<u>mu.dam-gu</u>	*!				***

Yidj: Word-Level Footing

Input: (gu.ma).ri-(da.ga)-nu, 'red-inchoative-past'

	FTH-FT	FT-2	NO-FIN	*CLASH	IAMB
☞ (gu.ma).ri-(da.ga)-nu					
(gu.ma).ri-(da.ga)-nu					*!
(gu.ma).(ri)-(da.ga)(nu)		*!*			
(gu.ma)(ri.da)(ga.nu)	*!				
gu.ma.ri.da.ga.nu	*!				

Yidj: Distribution of Word-Level Lengthening

(**mu**.dam)

(**gu**.da)(**ga**-gu)

(ma.**dj:n**).da.-(**ŋa**.lin)

(ŋu.**nanj**).(**ga**.**ra:-n**).da

(mu.**da:m**)-gu

(gu.**ma:**).ri-(da.**ga:**)-nu

→ Stressed vowels are lengthened
if they precede an unfooted syllable

Hungarian Vowel Harmony

Bisyllabic suffixes seem to behave like independent PWords

since they are opaque to vowel harmony

Hungarian Vowel Harmony: Backness

mos-**a**t 'make wash'
wash-CAUS

küld-**e**t 'make send'
send-CAUS

há**z**-**a**n 'in a house'
house-IN

ker**t**-**e**n 'in a garden'
garden-IN

Hungarian Vowel Harmony: Rounding

há-z-hoz 'to a house'
house-TO

ker-t-hez 'to a garden'
garden-TO

tü-z-höz 'to a fire'
fire-TO

Hungarian Vowel Harmony: Transparent Vowels (i,i:,e:)

papír 'paper'

fut-ni 'to run'
run-INF

papír-hoz 'to paper'
paper-TO

Jul-is-nak 'Julis (dat.)'
Julia-DIM-DAT

Hungarian Vowel Harmony: Non-Harmony

sof**ö**r-**ne**k ‘driver (dat.)’
driver-DAT

p**ö**zs**ó**-**na**k ‘Peugeot (dat.)’
Peugeot-DAT

Fer-k**ó**-**na**k ‘Ferko (dat.)’
Frank-DIM-DAT

Non-harmonizing Suffixes

Inflectional	Derivational
-kor	-kó
??	-ol
	-us
	-íroz
	-ist
	-ismus
	-u
	-a
	-ológ
	-ál
	-ifikál
	-ia
	...

Hungarian Vowel Harmony: Domains

Nespor & Vogel (1986) (and Booij, 1984):

- ▶ Phonological word (ω) = stem (+ suffixes)
- ▶ ω is the domain of vowel harmony

Stem+Stem Compound	[könyv] _{ω} - [tár] _{ω}
Prefix + Stem	[be] _{ω} - [utazni] _{ω}
Stem + Stem + Suffix	[lát] _{ω} - [kép-ünk] _{ω}
Stem + Case Suffix	[ház-ban] _{ω}
Stem + Postposition	[ház] _{ω} [mellett] _{ω}

Harmony across Stems + Suffixes

mos-**at** 'make wash'
wash-CAUS

küld-**et** 'make send'
send-CAUS

há**z**-**ban** 'in a house'
house-IN

ker**t**-**ben** 'in a garden'
garden-IN

No Harmony across Stems + Prefixes

- a. **oda**-**menni** 'to go there'
there-go
- b. **be**-**utazni** 'to commute in'
in-commute

No Harmony across Compound Members

a. Buda-Pest 'Budapest'

b. könyv-tár 'library'
book-collection

Empirical Errata in the Nespor & Vogel Description

- ▶ Prefixes are irrelevant for Vowel Harmony
- ▶ Bisyllabic Inflectional Suffixes systematically fail to harmonize

Prefixes

- ▶ **“Preverbs”:**
particles forming idioms with and prosodically integrated into verbs, but syntactically independent
 - ▶ **Derivational Loan Prefixes:**
with unclear morphophonological status (anti-, pre-, extra-, ...)
 - ▶ **leg-:**
The only inflectional prefix
- It is problematic to make any phonological generalization based on prefixes

Trommer (2008)

- ▶ Derivational Affixes follow the generalizations by Nespov & Vogel (1986), but inflectional affixes don't
- ▶ **Monosyllabic** inflectional suffixes harmonize with stems
Bisyllabic inflectional suffixes resist harmony with stems
- ▶ This becomes only evident by comparing monosyllabic and bisyllabic case suffixes (all other inflectional affixes are basically monosyllabic)

Hungarian Case Suffixes

- ▶ Traditionally only monosyllabic case suffixes are analyzed as such
bisyllabic case suffixes are called postpositions
- ▶ But “Case suffixes” and postpositions differ only for phonological purposes (e.g. in vowel harmony)
- ▶ but bot classes behave in the same way with regard morphosyntax

Monosyllabic vs. Bisyllabic Case Suffixes

Monosyllabic ("Case Suffixes")		Bisyllabic "Postpositions"	
<i>-nak/-nek</i>	dative	<i>alatt, alól, alá</i>	'under'
<i>-ban/-ben</i>	'in'	<i>mögött, mögül, mögé</i>	'behind'
<i>-ból/-ből</i>	'into'	<i>előtt, elől, elé</i>	'in front of'
<i>-on/-en/-ön</i>	'on'	<i>felett, felől, felé</i>	'above'
<i>-ról/-ről</i>	'from'	<i>között, közül, közé</i>	'between'
<i>-ra/-re</i>	'onto'	<i>mellett, mellől, mellé</i>	'besides'
<i>-nál/-nél</i>	'at'	<i>helyett</i>	'instead of'
<i>-tól/-től</i>	'from'	<i>miatt</i>	'because of'
<i>-hoz/-hez/-höz</i>	'to'	<i>nélkül</i>	'without'
<i>-val/-vel</i>	'with'	<i>szerint</i>	'according to'
		<i>iránt</i>	'towards'

All Case Suffixes Combine with Caseless NPs

Case Suffixes	Postpositions	Postpositional Adverbs
<i>János-∅-hoz</i> János-∅-to 'to John'	<i>János-∅ mellett</i> János-∅ next:to 'next to John'	<i>János-sal együtt</i> János-with together 'together with John'
★ <i>János-sal-hoz</i>	★ <i>János-sal mellett</i>	★ <i>János-∅ együtt</i>

All Case Suffixes are Right-Adjacent to Head Noun

Case Suffixes

pontosan János-hoz
 exactly János-to
 'exactly to John'

★ *János-pontosan-hoz*

Postpositions

pontosan János mellett
 exactly János next:to
 'exactly next to John'

★ *János pontosan mellett*

Postpositional Adverbs

János-sal teljesen együtt
 János-with completely together
 'completely together with John'

★ *teljesen János együtt*

All Case Suffixes Trigger Demonstrative Concord

Case Suffixes	<i>a-hoz a fiú-hoz</i> that-to the boy-to 'to that boy'	★ <i>az a fiú-hoz</i>
Postpositions	<i>az alatt a fa alatt</i> that under the tree under 'under that tree'	★ <i>az a fa alatt</i>
Postpositional Adverbs	<i>az-zal a fiú-val együtt</i> that-with the boy-with together 'together with that boy'	★ <i>az-zal együtt a fiú-val együtt</i>

Mono- vs. Bi-syllabic Case Suffixes in Vowel Harmony

		<i>a ház alatt</i>	<i>a kert alatt</i>
		the house under	the garden under
		'under a house'	'under a garden'
<i>a ház-ben</i>	<i>a kert-ben</i>		
the house-in	the garden-in		
'in the house'	'in the garden'		
		<i>a ház mellett</i>	<i>a kert mellett</i>
		the house next:to	the garden next:to
		'next to a house'	'next to a garden'

Empirical Assumptions

- ▶ I will disregard rounding harmony and transparent vowels
- ▶ Prefixes are irrelevant for the understanding of VH
- ▶ For roots and derivational affixes, harmony is a strong tendency, not the rule
- ▶ Monosyllabic inflectional affixes invariably harmonize
Bisyllabic inflectional affixes invariably fail to harmonize

Basic Analysis

- ▶ **Stem Level:**
Mono- and bi-syllabic affixes get differential (non-)footing just as in Ngalakan and Yidj
- ▶ **Stem Level:**
1-syllabic (unfooted) suffixes are underspecified for [back]
2-syllabic (footed) affixes are specified for [back]
- ▶ **Word Level:**
1-syllabic affixes harmonize due to their underspecification
2-syllabic affixes don't due to their full specification

Analysis of Roots

Prosody:

- ▶ Roots (and compounds) are left-aligned with alternating trochees at the stem level
- ▶ and with with a single trochaic foot at the word level


Harmony

- ▶ Roots are underlyingly fully specified for vowel quality
- ▶ Due to high-ranked IDENT_{LEX}, root vowels do not harmonize at stem or word level

Root Prosody: Evaluation


Stem Level:

Input: kert

	PS-SEG	Al-Wd	FT-BIN	PS- σ	AL-FT
 (kert)			*		
<u>kert</u>		*!		*	
kert	*!***	*			

Word Level:

Input: (kert)

	PS-SEG	AL-FT	PS- σ	FT-BIN	AL-WD
 (kert)				*	
<u>kert</u>			*!		
kert	*!***				


Root Harmony: Constraints

AGR [back]	Count a constraint violation for every pair of tier-adjacent vowels such that one of the vowels is [α back], and the other is not
IDENT [back]	Count a constraint violation for every output vowel V corresponding to an input vowel V' such that V' is [α back], and V is not
IDENT_{Lex} [back]	IDENT [back] restricted to lexical vowels i.e. vowels of a lexical morpheme (root or derivational affix)

Root Harmony: Evaluation


Stem Level:

Input: buda-pest

	IDENT _{LEX} [back]	AGR [back]	...	IDENT [back]
 buda-pest		*		
buda-past	*!			*
büde-pest	*!*			**

Word Level:

Input: buda-pest

	IDENT [back]	AGR [back]	...	IDENT _{LEX} [back]
 buda-pest		*		
buda-past	*!			*
büde-pest	*!*			**

Analysis of Derivational Suffixes

Prosody:

- ▶ Derivational suffixes are fully integrated into the prosodic structure of roots at both levels


Harmony

- ▶ Derivational suffixes underspecified for [back] undergo vowel harmony at the stem level
- ▶ Derivational suffixes specified for [back] maintain their vowel quality at all levels

Derivational Suffixes: Prosody


Stem Level:

Input: olvas-ol

	PS-SEG	Al-Wd	FT-BIN	PS- σ	AL-FT
 (olva)s-ol				*	
ol(vas-ol)		*!			
olvas-ol		*!		**	

Word Level:


Input: (olva)s-ol

	PS-SEG	AL-FT	PS- σ	FT-BIN	AL-WD
 (olva)s-ol				*	
ol(vas-ol)		*!			
olvas-ol			*!*		

Derivational Suffixes: Harmony


Stem Level:

Input: mos-At

	IDENT _{LEX} [back]	AGR [back]	...	IDENT [back]
 mos-at				
mos-et		*!		*
mes-at	*!	*		*

Word Level:


Input: küld-At

	IDENT _{LEX} [back]	AGR [back]	...	IDENT [back]
küld-at		*!		
 küld-et				*
kuld-at	*!	*		*

Derivational Suffixes: **Non-Harmony**


Stem Level:

Input: olvas-ol

	IDENT _{LEX} [back]	AGR [back]	...	IDENT [back]
 olvas-ol		*		
olvas-el	*!			*
ölvés-ol	*!*			**

Word Level:

Input: über-ol

	IDENT _{LEX} [back]	AGR [back]	...	IDENT [back]
 über-ol		*		
über-el	*!			*
obar-ol	*!*			**

Analysis of Bisyllabic Inflectional Suffixes

Prosody:

- ▶ **Stem Level:** Bisyllabic suffixes are assigned binary feet
- ▶ **Word Level:** Suffixes integrate into stem prosody

Harmony

- ▶ **Stem Level:**
Foot-head vowels are obligatorily [back]-specified
The other vowel harmonizes with the foot head
- ▶ **Word Level:**
Vowels retain their [back] specifications

2 σ -Inflectional Suffixes: Prosody

Stem Level:

Input: -mellet

	PS-SEG	Al-Wd	FT-BIN	PS- σ	AL-FT
☞ (mellet)					*
<u>mellet</u>				*!*	
mellet	*!****				

Word Level:

Input: (kert)-(mellet)

	PS-SEG	AL-FT	PS- σ	FT-BIN	AL-WD
☞ (kert-mel) <u>let</u>				*	
<u>kert-mellet</u>			*!*		
kert-mellet	*!*****				

2 σ -Inflectional Suffixes: Harmony – Constraints

*[back]	Avoid vowels with a specification of the feature [back]
SPEC-DET	The designated terminal element of a foot (the stressed vowel of the foot) should be fully featurally specified

2 σ -Inflectional Suffixes: Harmony

Stem Level:

Input: mAllAt

	ID _{LEX} [bk]	AGR [bk]	SPEC-DET	*[bk]	ID [bk]
☞ (mellet)				**	*
(mellAt)		*!		*	
(mAllAt)			*!		

Word Level:

Input: ház-mellet

	ID [back]	AGR [bk]	...	IDENT [back]
☞ ház-mellet		*		
héz-mellet	*!			*
ház-mallat	*!*			**

Analysis of Monosyllabic Inflectional Suffixes

Prosody:

- ▶ **Stem Level:** Monosyllabic affixes remain unfooted
- ▶ **Word level:** inflectional affixes get integrated into the prosodic structure of roots

Harmony

- ▶ **Stem Level:** Vowels in unfooted affixes are obligatorily underspecified for [back]
- ▶ **Word level:** Underspecified affixes harmonize with stems

1 σ -Inflectional Suffixes: Prosody

Stem Level:

Input: -bAn

	PS-SEG	Al-Wd	FT-BIN	PS- σ	AL-FT
(bAn)			*!		*
☞ <u>bAn</u>				*	
bAn	*!***	*			

Word Level:

Input: (kert-ben)

	PS-SEG	AL-FT	PS- σ	FT-BIN	AL-WD
☞ (kert-ben)				*	
<u>kert-ben</u>			*!*		
kert-ben	*!*****				

1 σ -Inflectional Suffixes: Harmony

Stem Level:

Input: ben

	ID _{LEX} [bk]	AGR [bk]	SPEC-DET	*[bk]	ID [bk]
☞ <u>bAn</u>					
<u>ben</u>				*!	*

Word Level:

Input: ház-bAn

	ID [back]	AGR [bk]	...	IDENT [back]
☞ ház-b <u>an</u>				
ház-b <u>An</u>		*!		**
h <u>é</u> z-b <u>en</u>	*!			*

Advantages of the Stratal Analysis

- ▶ derives the fact that 2-syllabic inflectional affixes show exceptionless morpheme-internal harmony
- ▶ derives the fact that 2-syllabic inflectional suffixes are unharmonic while 1-syllabic ones are harmonic
- ▶ captures the greater exceptionality of backness harmony in roots and internal suffixes

Problems with the PWord Analysis

- ▶ cannot explain why bisyllabic suffixes don't show stress
- ▶ involves non-local types of alignment constraints

PWord Analysis in Trommer (2008)

ALIGN (HdFOOT, ⇔, PWD, ⇔):

Align the left edge of syntactic terminals
corresponding to . . . two syllables
to the left edge of a PWord

- The alignment constraint refers
non-locally to entire morphemes

(cf. also Baker, 2005 on Ngalakan)

Summary

- ▶ 2-syllabic affixes with word-like phonological behaviour can be captured without the PWord
- ▶ Strata, feet and syllables are enough
- ▶ Stratal analyses capture additional generalizations and avoid problems raised by PWord accounts

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