

An introduction to phonological representations

EGG 2017, Olomouc

Autosegmental phonology

- SPE-style representations were composed of matrices of unordered features
- all features had the same status
- Chomsky and Halle's (1968: ch. 7)
- [+vocalic]: 'oral cavity in which the most radical constriction does not exceed that of high vowels i and u...'
- [+consonantal]: 'radical obstruction in the midsagittal region of the vocal tract', 'obstruction must be at least as narrow as that found in fricative consonants...'

Autosegmental phonology

- [+coronal]: ‘...blade of the tongue raised from the neutral position...’
- [+anterior]: ‘...obstruction that is located in front of the palato-alveolar region...’
- [+high]: ‘...body of the tongue [raised] above the level that is occupied in the neutral position...’ (i.e. English vowel in *bed*)
- [+low]: ‘...tongue below the level occupied in the neutral position...’
- [+back]: ‘...produced by retracting the body of the tongue from the neutral position...’

Autosegmental phonology

- [+labial]: ‘...narrowing of the lip orifice...’
- [+nasal]: ‘...produced with lowered velum...’
- [+continuant]: ‘...vocal tract not narrowed to the point where the airflow past the constriction is blocked...’
- [+strident]: ‘...marked acoustically by greater noisiness than their nonstrident counterparts...’
- Chomsky and Halle (1968: 336)

(10)

[+voc
-cons
+high
-back
-ant
-cor
+cont
-nasal
-strid]

→

[-voc
-cons
+high
-back
-ant
-cor
+cont
-nasal
-strid]



[-voc
+cons
-high
-back
+ant
-cor
-cont
-nasal
-strid]

[+voc
+cons
-high
-back
-ant
+cor
+cont
-nasal
-strid]

[-voc
-cons
+high
-back
-ant
-cor
+cont
-nasal
-strid]

[+voc
-cons
-high
+back
-ant
-cor
+cont
-nasal
-strid]

Autosegmental phonology

- William Leben's 1973 and John Goldsmith's 1976 dissertations were inspired by a crucial observation: **in many languages even short vowels are allowed to carry two tones (high tone and low tone)**
- this was impossible to express in an SPE model
- a single segment **could not** be simultaneously marked for the [+Highpitch] and [-Highpitch], [+Lowpitch] and [-Lowpitch]
- Goldsmith (1976: 38) falling tone /â/

Autosegmental phonology

(6)

	+syllabic
	+constricted pharynx
	-high
	-round
	.
	.
a {	+Highpitch
	-Lowpitch
b {	-Highpitch
	+Lowpitch

Autosegmental phonology

- such a representation does not distinguish between falling tone (high-low) and raising tone (low-high)
- features within feature matrices were not in temporal relations
- such a representation violates the basic logic of language:
- on the assumption that for a given segment (/p/), a given value for a feature is mapped onto the segment by a function, e.g.

$$F_{\text{voice}}(p) = -$$

Autosegmental phonology

- in the same way:

$$F_{\text{highpitch}}(\text{a}) = +$$

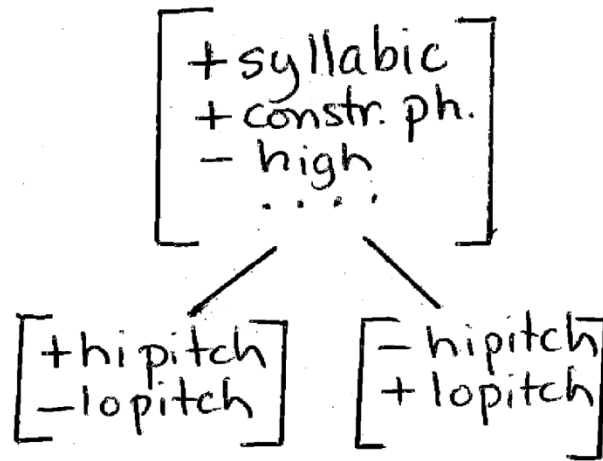
AND

$$F_{\text{highpitch}}(\text{a}) = -$$

- is impossible! This follows from the nature of functions
- a single segment /a/ cannot be high tone and low tone at the same time
- ergo: tones must belong to a different segment, they form a separate AUTOSEGMENT

Autosegmental phonology

(10)



or



Autosegmental phonology

- exactly the same logic applies to affricates (ts, tʃ) (different values of feature [continuant])
- prenasalized stops (^mb, ⁿtʃ) (different values of feature [nasal])
- is extendable to secondary place of articulation (t^w, p^j)

Autosegmental phonology

- Tone stability arguments Goldsmith (1976: 42-47, ch. 2)
- Stability: in tone languages it is often the case that when a vowel is deleted or desyllabified ($i \rightarrow j$), the tone of the vowel is preserved

á#è → ê

Autosegmental phonology

- the analyses that existed in the 70s were mainly **procedural**:
- (1) tone copy rules + vowel deletion
- $\acute{a}\grave{e} \rightarrow \acute{a}\hat{e} \rightarrow \hat{e}$
- (2) constraint: preserve tones when a vowel is deleted

Autosegmental phonology

Lovins 1971, Lomongo stability

- (37) bàlóngó bǎkáé → bàlóngǎkáé 'his book'
bǎnà bǎmǒ → bǎnǎmǒ 'other children'
bǒmǒ bǒtámǎ → bǒmǒtámǎ 'another tree'
bǎtswá là èmí → bǎtswémí 'you who lead me away'

Autosegmental phonology

- why should tone features be preserved or copied and not other features?
- stability is also observed in cases of (nearly) total vowel assimilation (Igbo, Yoruba)
- á#è → éè

Autosegmental phonology

- tone stability is expected if tonal features are separate (auto)segments
- they are **associated** with other features so that the two classes of features are realized simultaneously
- each autosegment must be associated in order to be realized

Autosegmental phonology

- English indefinite article:

Stem in C

/ə/ cat

/ə/ dog

/ə/ joke

/ə/ fresh apple

/ə/ window

/ə/ university

Stem in V

/ən/ ape

/ən/ eagle

/ən/ orange

/ən/ apple

/ən/ ugly window

/ən/ open university

Autosegmental phonology

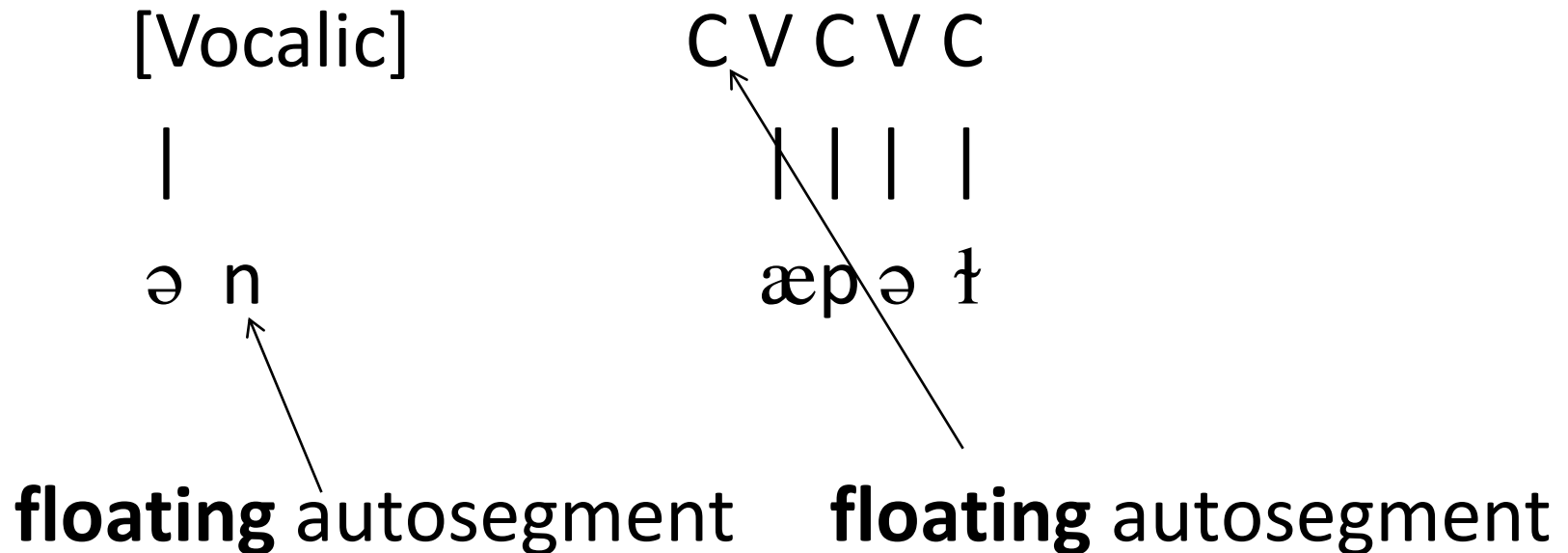
- Procedural solutions:
- insertion of /n/ before a vowel
- $\emptyset \rightarrow n / _ _ V$
- Deletion of /n/ before a consonant
- $n \rightarrow \emptyset / _ _ C$

Autosegmental phonology

- Procedural solutions must be made morpheme specific
- insertion of /n/ before a vowel
- $\emptyset \rightarrow n / _ _ V$ (in the indefinite article)
- Deletion of /n/ before a consonant
- $n \rightarrow \emptyset / _ _ C$ (in the indefinite article)

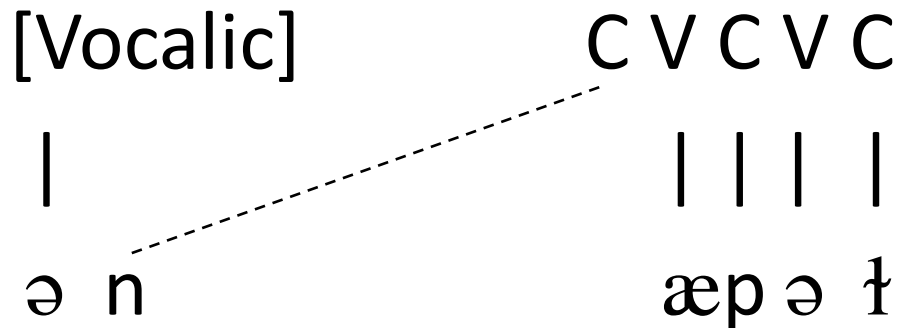
Autosegmental phonology

- a representational solution: 'an apple'



Autosegmental phonology

- a representational solution: 'an apple'



Autosegmental phonology

- a representational solution: ‘a cat’

V		C	V	C
ə	n	k	æ	t

- the only necessary assumption is that floating autosegments want to be linked
- the only operation necessary is linking

i/n/+compatible → i/ŋ/compatible

i/nk/compatible	AgrPlace; NC	Identpl;Ons	DEP	MAX SEG	FAITH
[nk]	*!				
☞ [ŋk]					*
[nt]		*!			*
[n]				*	*!
[nək]			*!		*

lo/ng/ → lo/ŋ/

lo/ng/	AgrPlace; NC	Identpl;Ons	DEP	MAX SEG	FAITH
[ng]	*!				
☞ [ŋg] 💣					*
[ŋ] ☹				*	*!
[n]				*	*!
[nək]			*!		*

Autosegmental phonology

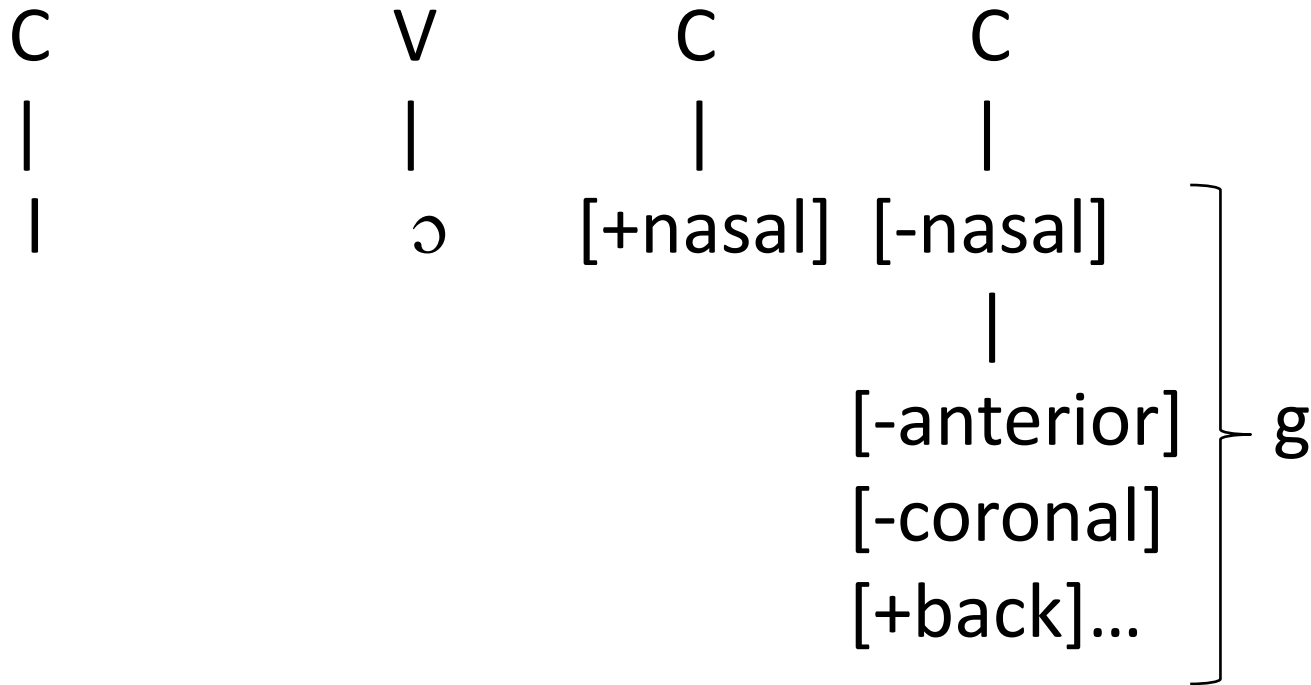
- lo/ŋ/ - lo/ŋg/er, stro/ŋ/ - stro/ŋg/er

/g/ → ∅ / [+nasal] __ #

- *g: ‘Don’t be /g/’ = ‘Make sure that /g/ is not linked/realized’
- MAX Ons: ‘Do not delink consonants followed by vowels’

Autosegmental phonology

- 'long'

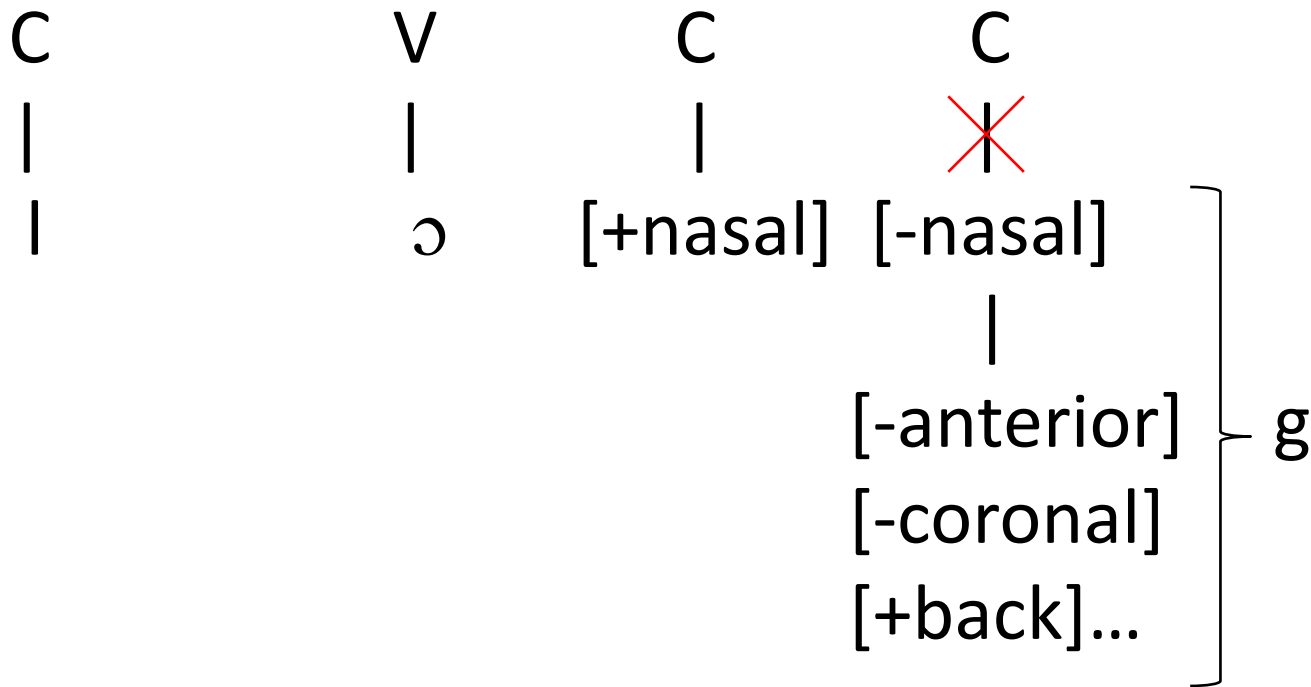


Autosegmental phonology


- lo/ŋ/ - lo/ŋg/er, stro/ŋ/ - stro/ŋg/er
- AgrPlace;NC: 'A nasal and a following consonant must share the same place of articulation'
- this constraint does not specify if the following segment is realized or not

Autosegmental phonology

- 'long'




lo/ŋ/

	lo/ng/	AgrPlace; NC	Max Ons	DEP	*g	FAITH
a.	[ng]	*!			*	
b.	[ŋg]				*!	*
c.	 [ŋ]					*
d.	[n]	*!				*
e.	[nək]			*!		*

- candidate (d) violates ARGplace;NC because /g/ is present in the representation, only not associated

lo/ŋ/ - lo/ŋg/er

	lo/ng/er	AgrPlace; NC	Max Ons	DEP	*g	FAITH
a.	[ng]	*!			*	
b.	 [ŋg]				*	*
c.	[ŋ]		*!			*
d.	[n]	*!	*			*
e.	[nək]			*!		*

Autosegmental phonology

- Autosegmental phonology is an established approach to phonological representations
- there are several versions of it all of which share the properties established in the 1970s in Goldsmith's dissertation