Brückenkurs WS2008/9
Phonology

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08.10.2008

Phonology

Phonology aims to describe the way [the] medium of human vocal sound is structured, in language in general as well as in individual languages

Carlos Gussenhoven

Minimal pairs

Word lists

hit

Minimal pairs

Word lists

hit

hat

Minimal pairs

Word lists

hit
hat
hut

Minimal pairs

Word lists

hit
hat
hut
hot

Minimal pairs

Word lists

hit	
hat	pat
hut	
hot	

Minimal pairs

Word lists

hit		
hat	pat	sat
hut		
hot		

Minimal pairs

Word lists

hit			
hat	pat	sat	fat
hut			
hot			

Minimal pairs

Word lists

hit
hat pat sat fat
hut
hot

- minimally different phonetic form
- distinct meaning
- yields list of phonetic segments

UPSID

- UCLA Phonetic Segment Inventory Database
- lists languages and their sounds
- web front-end:
  `http://web.phonetik.uni-frankfurt.de/upsid.html`

"Allos" and "Emes"

Phonetic segments in a language can be distinctive or occur in complementary distribution.
Minimal pair lists produce lists of phones, more formally *allophones*. These can be categorized into *phonemes*.

The Phoneme

Structuralist definition of a phoneme:

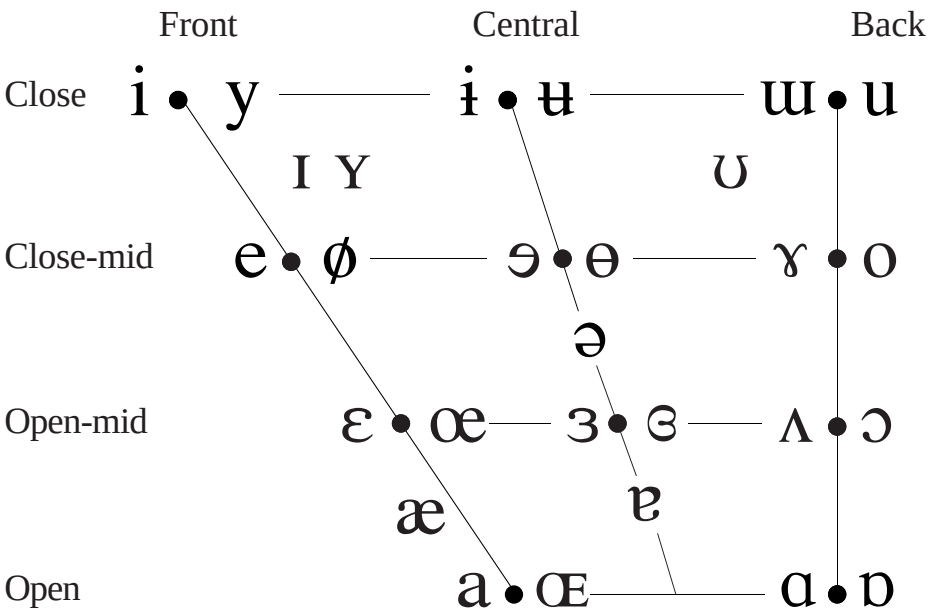
> *The smallest units which make a difference in meaning*
>
> Leonard Bloomfield

IPA Consonants

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

IPA Vowels



Where symbols appear in pairs, the one to the right represents a rounded vowel.

"Sub-phonemic particles"

- minimal linguistic units
- binary oppositions
- limited set of universal DFs
- phonetically motivated

Jakobson, Fant & Halle

Feature matrix for English

	o	a	e	u	ə	i	l	ŋ	ʃ	t͡ʃ	k	ʒ	d͡ʒ	g	m	f	p	v	b	n	s	θ	t	z	ð	d	h	ʔ
Vocalic/Non–vocalic	+	+	+	+	+	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Consonantal/Non–Consonantal	–	–	–	–	–	–	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	–	–
Compact/Diffuse	+	+	+	–	–	–		+	+	+	+	+	+	+	–	–	–	–	–	–	–	–	–	–	–	–		
Grave/Actute	+	+	–	+	+	–									+	+	+	+	+	–	–	–	–	–	–	–		
Flat/Plain	+	–		+	–																							
Nasal/Oral								+	–	–	–	–	–	–	+	–	–	–	–	+	–	–	–	–	–	–		
Tense/Lax									+	+	+	–	–	–		+	+	–	–		+	+	+	–	–	–	+	–
Continuant/Interrupted									+	–	–	+	–	–		+	–	+	–		+	+	–	+	+	–		
Strident/Mellow									+	+	–	+	+	+							+	–	–	+	–	–		

Chomsky & Halle (SPE)

Inherent features (1)

	Jakobson and Halle	Chomsky and Halle	Halle and Stevens (changes)
I.	*Major class features*		
	±vocalic	±vocalic (±syllabic)	
	±consonantal	±consonantal	
		±sonorant	
II.	*Cavity features*		added:
	compact/diffuse	±anterior	±labial
	grave/acute	±coronal	
	sharp/plain	±high	
	flat/plain	±low	
		±back	abolished:
		±round	±low for vowels
		±distributed	added:
		±lateral	±pharynx constriction
	nasal/oral	±nasal	
	(tense/lax)	±covered →	±advanced tongue root

Chomsky & Halle (SPE)

Inherent features (2)

	Jakobson and Halle	Chomsky and Halle	Halle and Stevens (changes)
III.	*Manner of articulation features*		
	discontinuous/continuant (=abrupt/continuant)	±continuant	abolished: ±tense for vowels
	tense/lax	±tense	added: ±advanced tongue root
	(strident/mellow)	±instantaneous release	
	checked/unchecked	pressure suction	
IV.	*Source features*		
	strident/mellow	±strident	
	voiced/voiceless	±voice	±stiff vocal cords
	(tense/lax)	±heightened subglottal pressure	±slack vocal cords ±spread glottis ±constricted glottis
	(II)	±glottal constriction	

Phonological rules

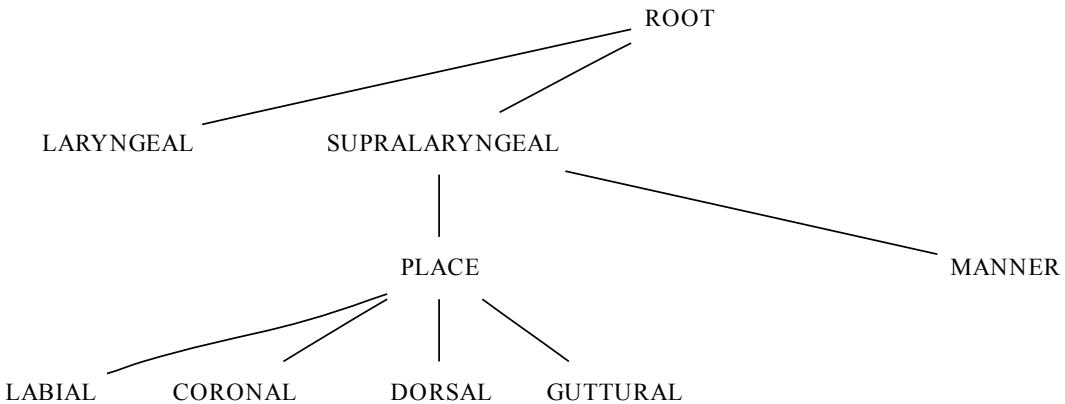
- ordered
- context-sensitive
- lexical/post-lexical

Example:

$$[ç] \rightarrow [x] | \begin{bmatrix} -\text{cons} \\ +\text{back} \end{bmatrix} \_$$

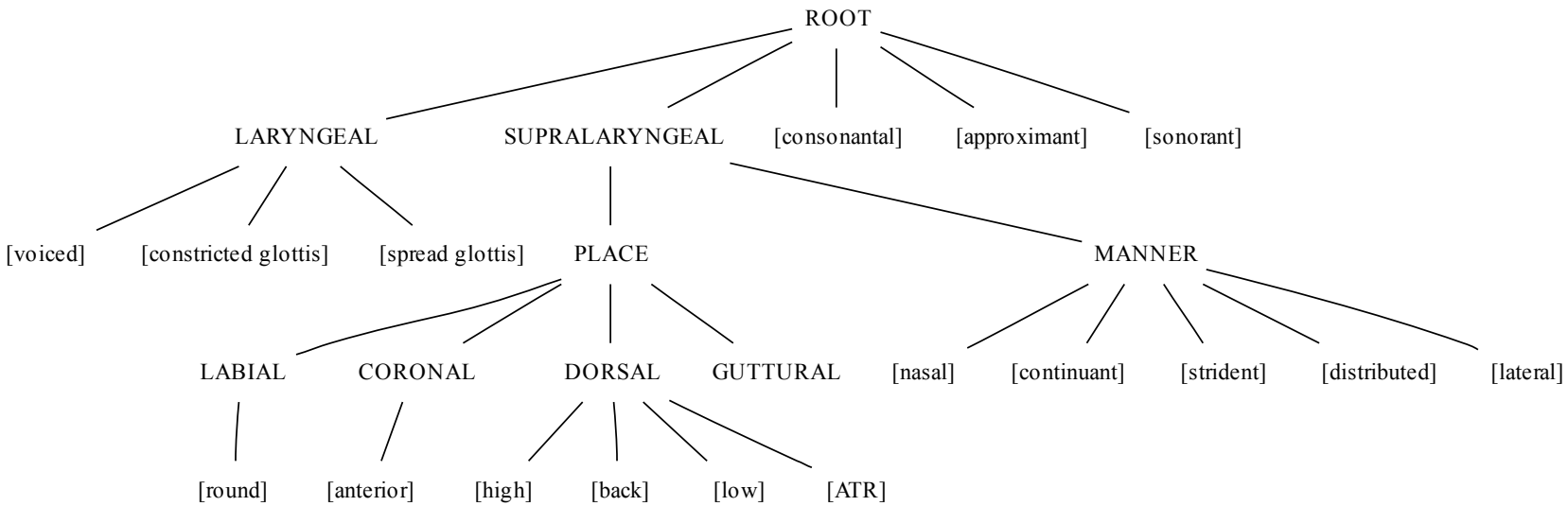
Feature Geometry

Major class features



Feature Geometry

All features



Example: *stamp*

[s]	[t]	[æ]	[m]	[p]
+ cons	+ cons	− cons	+ cons	+ cons
− son	− son	+ son	+ son	− son
+ cont	− cont	+ cont	− cont	− cont
+ cor	+ cor	+ low	+ lab	+ lab
+ ant	+ ant	− back	+ nas	+ nas
− voice	− voice	+ voice	+ voice	− voice

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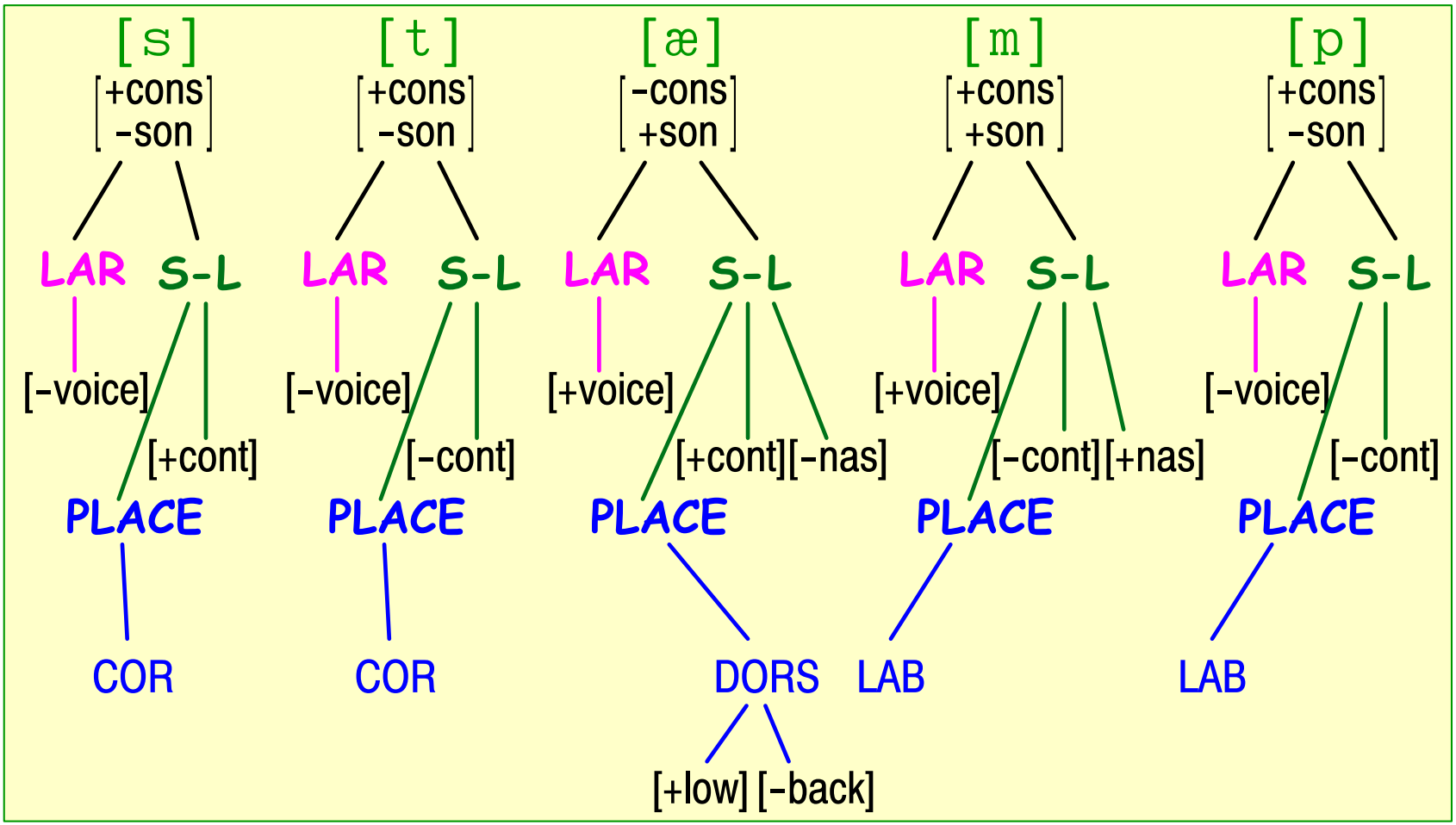
Example: *stamp*



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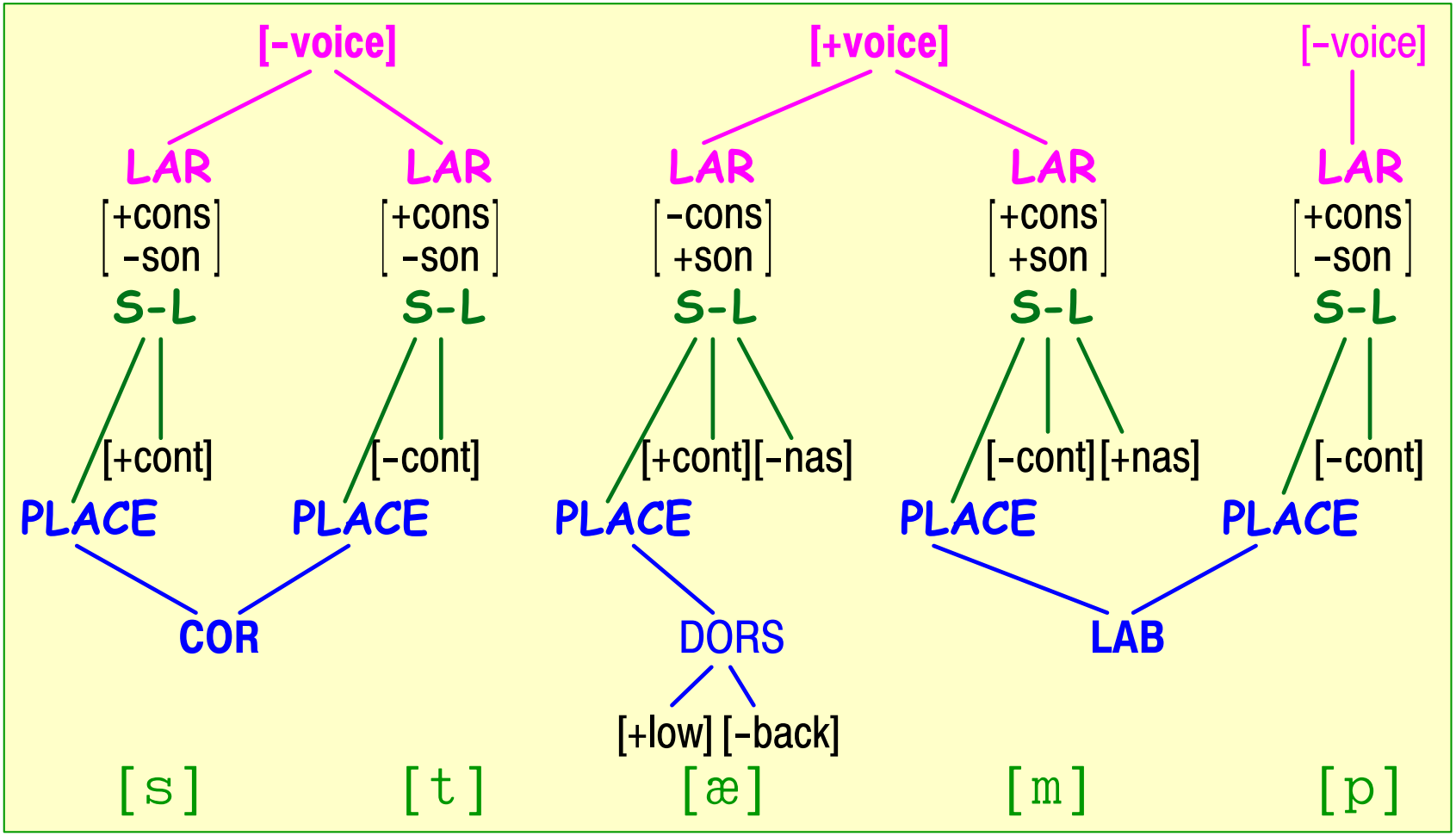
Example: *stamp*



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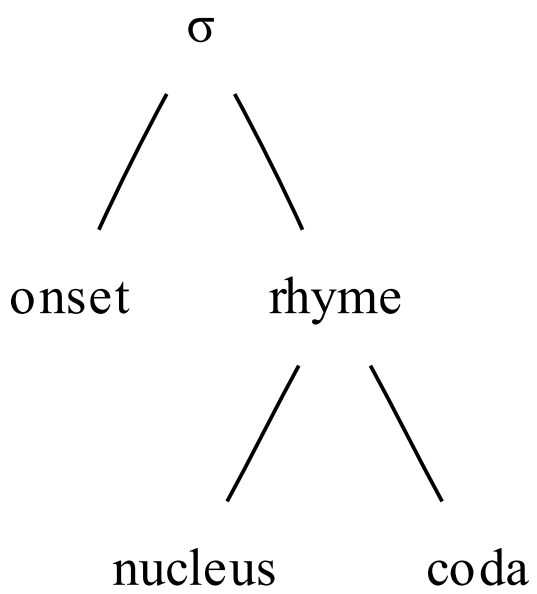
Syllable structure



Phonotactics

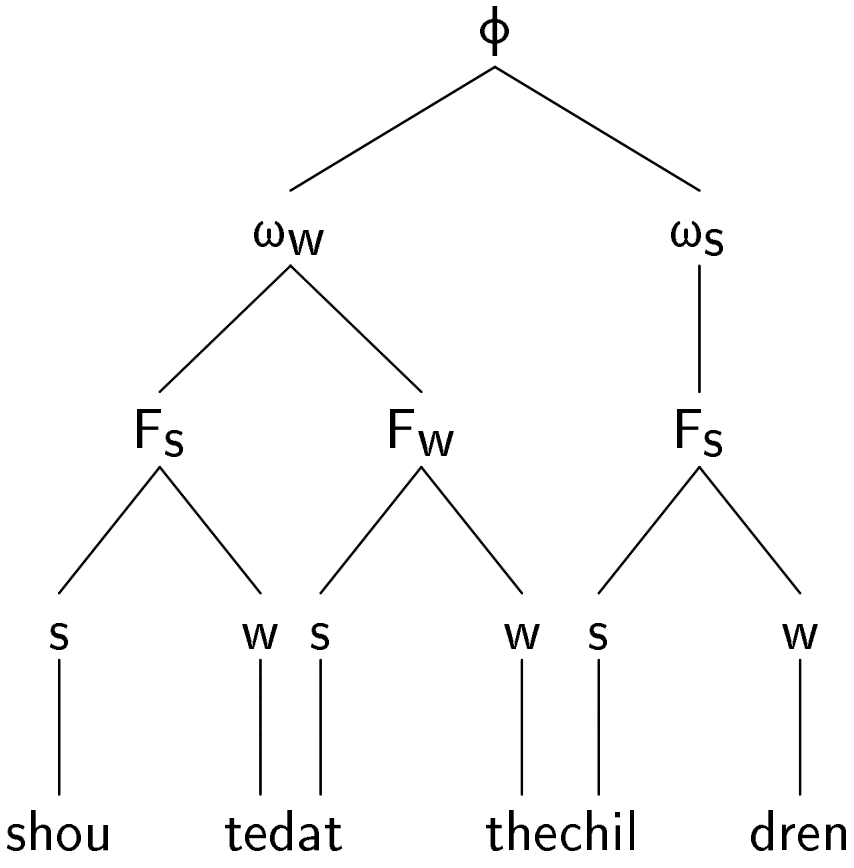
Regex

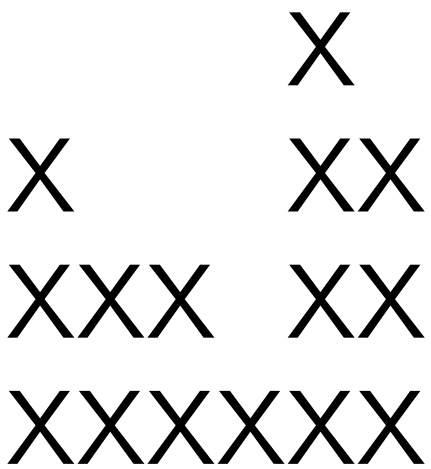
e.g. C* V{1,2} C*

Sonority hierarchy

Vowels
Approximants
Liquids
Nasals
Fricatives
Stops

Metrical tree/grid





Autosegmental description of tone

Tones are associated with syllables, where one tone can be associated with several syllables or several tones can be associated with one syllable:

E.g., from Mende (Sierra Leone)

	"was"	"house"	"waistline"			
1.	ko	pe	le	ha	wa	ma
	H	H			H	

	"owl"	"dog"	"junction"			
2.	mbu	ngi	la	fe	la	ma
	H	L	H	L	H	L

	"companion"	"woman"	"monkey-nut"					
3.	mba		nja	ha		ni	ki	li
	L	H	L	L	H	L	L	H	L

Optimality Theory

English

/hand/	IDENT–IO[vce]	*VOICED–CODA
☞ [hand]		*
[hant]	*!	

German

/hand/	*VOICED–CODA	IDENT–IO[vce]
[hand]	*!	
☞ [hant]		*