

## Class 1: Prosodic phrasing

### Overview of the classes

Class 1: Prosodic phrasing

Class 2: Tone and intonation

Class 3: Intonation as a correlate of phrasing

Class 4: Empirical and comparative studies of some issues related to syntax-phonology-information structure interface

Class 5: Discontinuous nominal phrases in a typological comparison

### 1. Prosody and intonation

Prosody: Tones, accents and phrasing and how they relate with each other and with syntax

Syntax: word order, constituency, syntactic phrasing, phases, syntactic ambiguities

Information structure: Potential correlates of IS are syntactic and/or prosodic

Typology: variation across languages

An intonation language like English assigns melodies to words and sentences, and these melodies have several sources. A falling contour on *cars*, as in Table 1a. stands for a neutral declarative intonation, as an answer to a question like *What did you see?*

*Many cars* can have different contours without affecting the lexical meaning of the words.

<p>I saw many CARS</p> <p>a.</p>	<p>Did you see many CARS?</p> <p>b.</p>	<p>I didn't say a few cars, I said MAny cars</p> <p>c.</p>	<p>I know that you saw cars, but did you see MAny cars?</p> <p>d.</p>
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**Table 1.** Falling and rising tonal contours in English

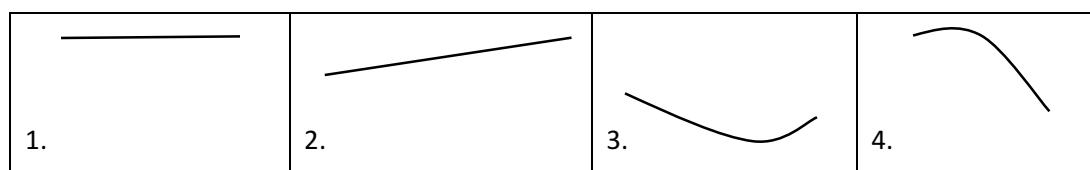
<p>MAny CARS</p> <p>a.</p>	<p>MAny CARS?</p> <p>b.</p>	<p>MAny CARS?</p> <p>c.</p>	<p>MAny CARS</p> <p>d.</p>	<p>JOnathan!</p> <p>e.</p>
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**Table 2.** More tonal contours in English

In Beijing Mandarin Chinese, the words themselves are associated with melodies, and these melodies are largely invariant. A monosyllabic word like *ma* can change its melodic pattern in the same way as *cars* in English does, but the changes in melodic pattern go along with changes in lexical meaning.

Basic Pitch Shape	Pitch Value	Examples
T1. High Level (H)	55	mā 'mother'
T2. Rising (LH)	35	má 'hemp'
T3. Low or Falling-Rising (L)	21(4)	mǎ 'horse'
T4. Falling (HL)	51	mà 'to scold, to blame'

**Table 3.** Beijing Mandarin lexical tones



**Fig.1** Beijing Mandarin lexical tones

Despite evident similarities, the melodic patterns are the consequence of different grammars in different types of languages. The same kind of melodic rise or fall can be the result of different grammatical features or properties, assigned in different ways to prosodic constituents.

Intonation and prosodic structure are concerned with the melodic part of spoken language.

- Here intonation and prosody are considered from a grammatical perspective, in a decidedly phonological approach.
- In the phonological view of intonation, tones and resulting tonal contours are grammatical objects, sometimes compared to morphemes, which interact with other components of grammar, like syntax and semantics.
- Typological comparison will play an important part.

#### (1) Intonation

Intonation is the tonal structure of speech making up the melody produced by our larynx. It has a phonetic part, the fundamental frequency (F0) and a grammatical (phonological) part.

#### (2) Prosodic structure

Prosodic structure refers to the parsing of continuous speech in prosodic domains – mora, syllable, foot, prosodic phrase and intonation phrase, and their correlates.

## 2. Indirect reference hypothesis, prosodic hierarchy and Strict Layer Hypothesis

The indirect approach in prosody conceives of the relationship between acoustics and meaning as being mediated by phonology, and in the case of intonation, by prosodic constituency and tonal grammar. Intonational components are related to linguistic expressions organized in prosodic constituents.

#### (3) Prosodic hierarchy (adapted from Nespor & Vogel 1986, Selkirk 1984 and others)

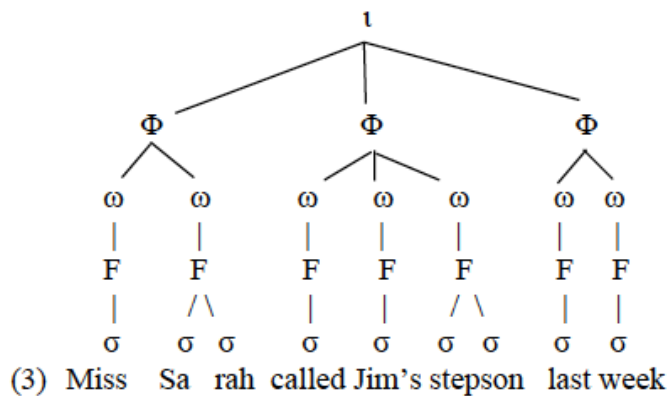
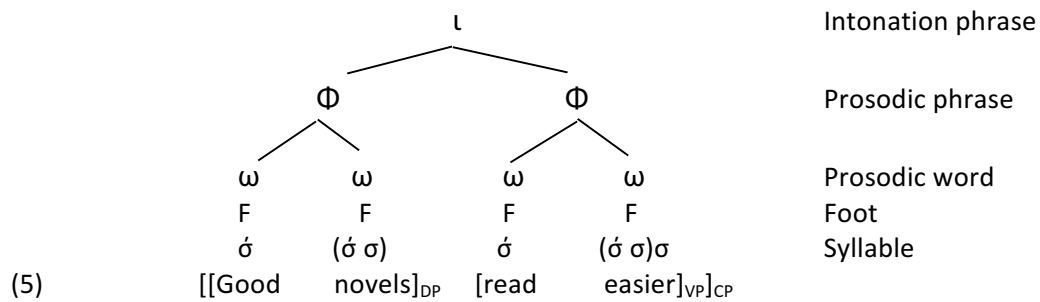
ι-phrase	intonation phrase	(corresponds roughly to a clause)
Φ-phrase	prosodic phrase	(corresponds roughly to a syntactic phrase)
ω-word	prosodic word	(corresponds roughly to a grammatical word)
F	foot	(metrical unit: trochee, iamb...)
σ	syllable	(strings of segments: CV, CVC, ...)
μ	mora	(unit of syllable weight)

#### (4) Strict Layer Hypothesis (SLH, Nespor & Vogel 1986:7)

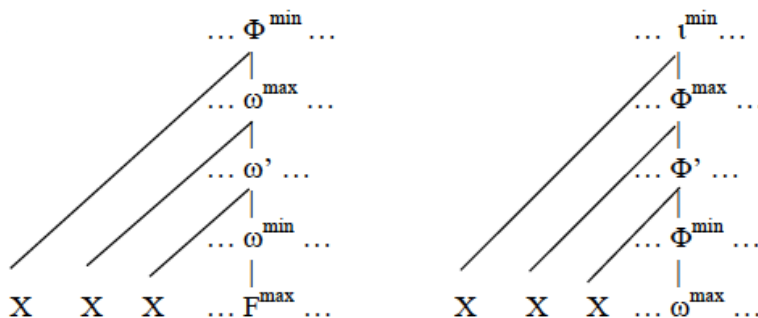
Principle 1. A given nonterminal unit of the prosodic hierarchy,  $X_p$ , is composed of one or more units of the immediately lower category,  $X_{p-1}$ .

Principle 2. A unit of a given level of the hierarchy is exhaustively contained in the superordinate unit of which it is a part.

Prosodic hierarchy is based on syntax.



(5) An alternative to Strict Layer Hypothesis: Recursive min-max model (Ito & Mester 2009)

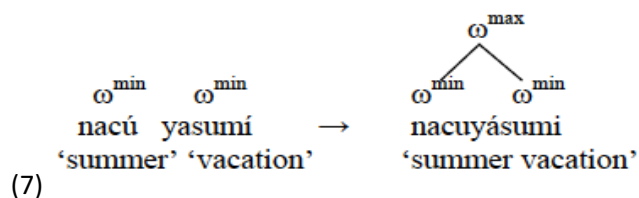


(6) Distinction between different levels of the same category: a  $\omega^{\min}$  can differ from a  $\omega^{\max}$

Maximal  $\omega$  ( $\omega^{\max}$ ):  $\omega$  not dominated by  $\omega$ .

Minimal  $\omega$  ( $\omega^{\min}$ ):  $\omega$  not dominating  $\omega$ .

$\omega'$ :  $\omega$  dominated by  $\omega$  and dominating  $\omega$ .



**Fig 2.** Compounds in Japanese: accent is on the first syllable of the second word

Word compounds		Phrasal compounds	
		Monophrasal	Biphrasal
<p>a. <math>\omega</math> <math>\omega</math> <math>\omega_2</math></p>		<p>c. <math>\omega_1</math> <math>\omega</math> <math>\omega</math></p>	<p>d. <math>\omega_1</math> <math>\omega</math> <math>\omega</math></p>
hoken-gaisya bānare insurance company departure 'movement away from insurance company'		hatsu kao-āwase first.time face align 'first face-to-face meeting'	zénkoku kaisya-ānnai nation-wide company guide 'nation-wide corporate guide'

### 3. Hyman's distinction between stress and tones

(8) Stress characterizes the abstract property of being prominent, and is best represented on a metrical grid.

Properties of stress according to Hyman (2006:231).

- Culminativity implies that every  $\omega$ -word has a unique primary stress
- Stress is *definitional* of a  $\omega$ -word: if some prosodic constituent has stress, it is a word
- Obligatory Head condition in languages with lexical stress: stress is obligatory in every word.

(9) Lexical **tones** are tonal specifications (level or contour tones) assigned to syllables or to moras at the level of  $\omega$ -words.

(10) Properties of tones according to Hyman (2006:230)

- Tones are featural and, as such they can be identified.
- Properties of a tone language according to Hyman (2006:229): 'A language with tone is one in which an indication of pitch enters into the lexical realisation of at least some morphemes.'
- Here: tone and stress are assigned to prosodic constituents, not to morphemes.

Differences between African and Asian tones:

In African languages: tonal contours are sequences of individual tones; stability and autonomy of tones.

(11) Kukuya (Bantu; Republic of Congo, Paulian 1975, Hyman 1987):

Mapping of a LHL melody according to the syllable structure and number of tone-bearing units (TBUs) on the five prosodic stem shapes (max 3 syllables, 3 moras):

- CV: (ndé) bvĩ '(s/he) falls'
- CVV: (ndé) kâây '(s/he) loses weight' /kâî/
- CVCV: (ndé) pâlî '(s/he) goes out'
- CVVCV: (ndé) bàámì '(s/he) wakes up'
- CVCVCV: (ndé) kâlégì '(s/he) turns around'

In Asian languages such as Vietnamese and Mandarin: tonal contours should be interpreted as units, and not as sequences of individual tone, they are parts of the syllables or morphemes that carry them, see Table 3.

#### 4. Words without lexical stress and without lexical tone

Several languages are candidates for being phrase languages: French, Finnish, West Greenlandic, many Indian languages have no lexical stress (or fixed one) and no lexical tone.

French: There is no minimal pair distinguishing two words on the basis of stress and there could not be such minimal pair in French.

Preference for disyllabic feet in some of its morphological operations, for instance in hypocoristic formation (involving nicknames and the like), see (12). This process does not imply a lexical stress in the original word. The acute accent on the transcriptions stand for a perceptually prominent syllable.

(12) French has feet and prosodic words but no lexical stress and no lexical tone

- a. Dominique 'name' → (Dodo)<sub>ω</sub> [dodó]
- b. ours 'bear' → (nounóurs)<sub>ω</sub> [nunúχs] 'teddy bear' from *un ours*, 'a bear'
- c. grand-mère 'grand mother' → (Mémé)<sub>ω</sub> [memé] 'grandma'

Schwa syllables do not carry tones, except when they are the only vowel of a word. A word like *table* 'table' can be mono- or bisyllabic, depending on the environment. The same is true for a word like *ours* '. In some words, by contrast, since schwa is the only vowel of the final word, it does carry the final Φ-phrase tone. Epenthetic schwas do not count as syllables' nuclei, underlying ones do (contra Dell 1984).

- (13)
- a. table noire [tab nwar]/ [tablə nwar] 'black table'
  - b. ours blanc [uχs blā]/ [uχsə blā] 'white bear, white bear'
  - c. prends-le [pχā lə] 'take him'
  - d. moi je [mwa ʒə] 'me I'<sup>1</sup>

#### 5. Words with lexical stress and without lexical tone

(14) English, Dutch, German have minimal pairs of words with different stress position

- permit<sub>N</sub> vs. permit<sub>V</sub>      ábstráct<sub>N</sub> vs. absráct<sub>V</sub>
- éxport<sub>N</sub> vs. expórt<sub>V</sub>      cónstruct<sub>N</sub> vs. constrúct<sub>V</sub>

- (4)
- σ<sub>s</sub> σ<sub>w</sub>

σ<sub>s</sub> σ<sub>w</sub> σ<sub>w</sub>

σ<sub>w</sub>σ<sub>s</sub> σ<sub>w</sub>σ<sub>w</sub>

σ<sub>s</sub> σ<sub>w</sub> σ<sub>s</sub> σ<sub>w</sub>
- a. butter      b. camera      c. calamity      d. introduction
- 
- (5)
- x x

x x x

x x x x

x x x x x x

ω-word  
foot  
syllable
- a. butter      b. camera      c. calamity      d. introduction

(15) Trochaic pattern of prosodic words in English

- a. (ré)cord), (pá)rrót), (éle)phant, A(méri)ca
- b. a(génda), il(lú)sion), (August)
- c. (hó)le), bal(ló)on), in(tén)se), cor(rú)pt), rac(có)on)

(16) English complex ω-words consisting of one ω<sup>min</sup>

- a. Derivation with stress-shifting (or class 1) affixes: *atom-ic*, *music-al-ity*, *music-ian*,

<sup>1</sup> This is an idiomatic expression serving to signal that some persons are always speaking of themselves.

*Canton-ése, lemon-áde*

b. Inflection: *nut-s, boy-s, bush-es, laugh-ed, intend-ed, laugh-ing*

- (17) English complex  $\omega$ -words consisting of more than one  $\omega^{\min}$
- a. Derivation with stress-neutral (or class 2) affixes: *penni-less, happi-ness, neighbour-hood, human-like*
  - b. Compounding: *bláckbird, pétticoat*

### 5.1 Phrasing and tone assignment according to syntax

Metrical structure is assigned according to prosodic structure.

Culminativity is the key (at least for some languages): each prosodic constituent has a head and the head, typically a pitch accent on a lexical stress, defines this prosodic constituent.

- |   |   |   |   |   |   |   |   |   |   |   |   |                   |   |   |   |   |        |
|---|---|---|---|---|---|---|---|---|---|---|---|-------------------|---|---|---|---|--------|
| ( |   |   |   |   |   |   |   |   | x | ) |   | (l-phrase)        |   |   |   |   |        |
| ( |   | x | ) | ( |   | x | ) | ( |   | x | ) | ( $\Phi$ -phrase) |   |   |   |   |        |
| ( | x | ) | ( | x | ) | ( | x | ) | ( | x | ) | ( $\omega$ -word) |   |   |   |   |        |
| ( | x | ) | ( | x | . | ) | ( | x | ) | ( | x | .                 | ) | ( | x | ) | (foot) |
- (18) Miss Martin called her uncle last week

How do we build the prosodic constituents?

First we map them with syntactic constituents according to rules or constraints. A (too simple) algorithm:

- (19) Match Constraints (Selkirk 2011): mapping syntax into prosody
- a. MATCH CLAUSE  
A clause in syntactic constituent structure must be matched by a corresponding l-phrase in prosodic representation.
  - b. MATCH PHRASE  
A phrase in syntactic constituent structure must be matched by a corresponding  $\Phi$ -phrase in prosodic representation.
  - c. MATCH WORD  
A word in syntactic constituent structure must be matched by a corresponding  $\omega$ -word in prosodic representation.

Second, the prosodic structure resulting from (19) is subject to well-formedness constraints. Until recently, recursive structure or any other structure not obeying the constraints in (20) were forbidden by the Strict Layer Hypothesis.

- (20) Well-formedness constraints (where  $C_n$  = some prosodic category)
- a. NON-RECURSIVITY: A prosodic constituent  $C_n$  does not dominate another constituent of the same level  $C_n$ .
  - b. LAYEREDNESS: A prosodic constituent  $C_m$  does not dominate a constituent of a higher level  $C_n$ ,  $n > m$ .
  - c. HEADEDNESS: A constituent  $C_n$  dominates a constituent of the immediately lower level  $C_{n-1}$ . (A prosodic constituent has a head on the immediately higher level.)
  - d. EXHAUSTIVITY: No  $C_n$  immediately dominates  $C_{n-2}$ . (No prosodic constituent is skipped.)

In real life, SLH is violated very often, see (21).

				x		L
		x		x		Φ'
		x		x		Φ
x	x		x	x		ω
x	x		x	x		foot
x	x	x		x	x	syllable
(21)	((Good <sub>ω</sub> (novels <sub>ω</sub> ) <sub>Φ</sub> ) (read <sub>ω</sub> (easier <sub>ω</sub> ) <sub>Φ</sub> ) <sub>ι</sub>					

## 5.2 Tonal structure

Once prosodic structure and metrical structure are there, tones are assigned to metrical prominent positions (pitch accents) and to boundaries of prosodic constituents (here prosodic phrases and intonation phrases):

					x		L
		x		x		x	Φ
		x		x		x	ω
(22)	[(The young BAKER) <sub>Φ</sub> (had to bake ROLLS) <sub>Φ</sub> (early in the MORNING) <sub>ι</sub> ]						
		L* H <sub>Φ</sub>		L* H <sub>Φ</sub>		H* L <sub>Φ</sub>	L <sub>ι</sub>

H\*, L\* are pitch accents, H<sub>Φ</sub> L<sub>Φ</sub> are phrasal tones (H-, L-), and H<sub>ι</sub> L<sub>ι</sub> are boundary tone (H%, L%). Pitch accents may be bitonal.

The tonal structure in (22) is typical for a declarative clause.

Focus structure can change the prosodic and tonal structure (subscript F stands for focus): Baker is the focus of the sentence and carries the nuclear accent.

{Who has to bake rolls early in the morning?}

						x		L
						x		Φ
		x	x	x		x		ω
(23)	[[The young BAKER] <sub>F</sub> ] <sub>Φ</sub> (had to bake rolls) <sub>Φ</sub> (early in the morning) <sub>ι</sub> ]							
		H* L <sub>Φ</sub>						L <sub>ι</sub>

Questions have different contours, as have exclamative utterances. Subtle pragmatic distinctions may be expressed with intonation, sometimes on entire contours. Tones are usually assumed to be compositional as for their meaning (see Pierrehumbert & Hirschberg 1990). Moreover intonation may express emotions, speaker's attitude and so on.

## 6. Words with lexical stress and with lexical tone: Pitch accent languages or accentual tone languages

In intonation languages, the tones defining the sentence melody have their own grammar, and they associate at different points in the sentence, an important anchoring reference being the lexical stresses. Sentence melodies are partly independent of the text carrying them (see Pierrehumbert's 1980 finite grammar that defines which **kind of tones** are obligatory in an intonation phrase).

By contrast, tone languages and pitch accent languages do have **tone specifications** at the level of the ω-word. These specifications are invariant, and sentence intonation comes additionally, in the form of tones assigned at Φ-phrase and ι-phrase. Sentence intonation has to accommodate the lexical tones, and because of this, phrasal and sentence tones may be/could be more restricted than in intonation languages.

Hyman (2006:246) calls pitch accent languages ‘pick-and-choose’ languages, because they choose ‘among the properties that characterise prototypical tone vs. stress-accent systems’.

A definition is nevertheless possible: In a pitch-accent language, only main stress is also associated with a tonal specification.

## 6.1 Germanic pitch accent languages

(24) Swedish has two lexical tonal specifications: Accent 1 and Accent 2

- |    |                      |                     |                      |              |
|----|----------------------|---------------------|----------------------|--------------|
| a. | <sup>1</sup> and-en  | ‘the duck’          | <sup>2</sup> ande-n  | ‘the spirit’ |
|    | <sup>1</sup> regl-er | ‘rule-PL’           | <sup>2</sup> regl-ar | ‘mirror-PL.’ |
| b. | <sup>1</sup> fänrik  | ‘second lieutenant’ | <sup>2</sup> sommar  | ‘summer’     |
|    | <sup>1</sup> ketchup | ‘ketchup’           | <sup>2</sup> senap   | ‘mustard’    |

(25) Bruce’s (1977:133) basic pitch rules for word accents

Accent 1: H in the pre-stress syllable, L in the stressed syllable.

Accent 2: H in the stressed syllable, L in the post-stress syllable.

Bruce (1999) characterized Accent 1 as HL\* and Accent 2 as H\*L.

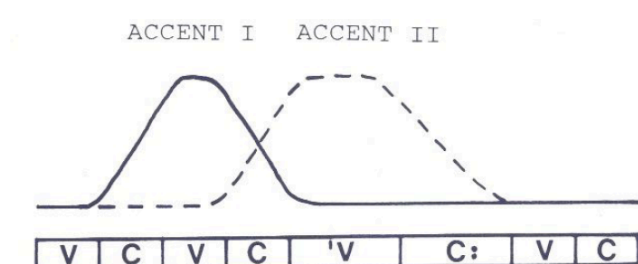


Fig.3 Bruce (1977:64)

- |      |    |                               |    |                                |
|------|----|-------------------------------|----|--------------------------------|
| (26) | a. | <sup>1</sup> anden            | b. | <sup>2</sup> an den            |
|      |    |                               |    |                                |
|      |    | HL*                           |    | H*L                            |
|      |    | ‘the duck’                    |    | ‘the ghost’                    |
|      |    | from <i>and-en</i> ‘duck.DET’ |    | from <i>ande-n</i> ‘ghost.DET’ |

(27) Riad’s (1998a) privative lexical tonal opposition

Accent 1: Ø

Accent 2: H\*

(28) a. Derivation: <sup>2</sup>sjuk,dom ‘illness’, <sup>2</sup>under,bar ‘wonderful’

b. Compounding: <sup>2</sup>sommar,dag ‘summer day’, ba<sup>2</sup>nan,skal ‘banana peel’, <sup>2</sup>byx,kjol ‘pant-skirt’

(29) Compound stress assignment

( ( ó )<sub>ω</sub> ( )<sub>ω</sub> )<sub>ω</sub>  
|  
H\* L\*

(30) a. H\* L\* H<sub>Φ</sub>  
a. ((<sup>2</sup>mellan,målen)<sub>ω</sub>)<sub>Φ</sub> ‘the snacks’ (compound)

H\*L HL\* H<sub>Φ</sub>  
b. ((<sup>2</sup>mellan)<sub>ω</sub> (<sup>1</sup>målen)<sub>ω</sub>)<sub>Φ</sub> ‘between the meals’ (phrase)

Sentence intonation: additional sentence accent and terminal juncture, Figure 3.





Plus a purely intonational L\*H tonal contour.

- (35)
- | Accent 1        | Accent 2              |
|-----------------|-----------------------|
| $\sigma \sigma$ | $\sigma \quad \sigma$ |
|                 |                       |
| L*H             | H L*H                 |
- (36)
- |                                    |               |                     |                |
|------------------------------------|---------------|---------------------|----------------|
| a. $^1\text{fe:br} + ^1\text{nat}$ | $\rightarrow$ | $^1\text{fe:bənat}$ | ‘fever night’  |
| b. $^2\text{sømmr} + ^1\text{nat}$ | $\rightarrow$ | $^2\text{sømmənat}$ | ‘summer night’ |
- (37) Minimal pairs in Danish
- |                    |                       |
|--------------------|-----------------------|
| a. Words with stød | b. Words without stød |
| hund [hun’] ‘dog’  | hun [hun] ‘she’       |
| vend [vən’] ‘turn’ | ven [vən] ‘friend’    |
| sum [sóm’] ‘sum’   | sum [sómə] ‘sums’     |





Central Franconian dialects are also pitch accent languages (see Hermans 1985, Schmidt 1986, Gussenhoven & van der Vliet 1999, Gussenhoven & Peters 2004)

## 6.2 Japanese and Turkish

### 6.2.1 Japanese

- |         |                |                    |                |            |
|---------|----------------|--------------------|----------------|------------|
| (38)    | Initial accent | Penultimate accent | Final accent   | Unaccented |
|         | H*L            | H*L                | H*L            |            |
|         |                |                    |                |            |
|         | ínoti          | kokóro             | atamá          | sakana     |
|         | 'life'         | 'heart'            | 'head'         | 'fish'     |
|         | H*L            | H*L                |                |            |
|         |                | /                  |                |            |
| (39) a. | hána 'a name'  | b. haná 'flower'   | c. hana 'nose' |            |

Words are 'accented' or 'unaccented', have a lexical tone or not. An accented  $\omega$ -word carries a pitch accent  $H^*L$ , and it forms a  $\Phi$ -phrase by itself, see Gussenhoven (2004) and Vance (2008:142-54), a.o. Japanese assigns tones to  $\Phi$ -phrases. There is an initial  $L_\Phi$  in the  $\Phi$ -phrase, followed by  $H_\Phi$ .

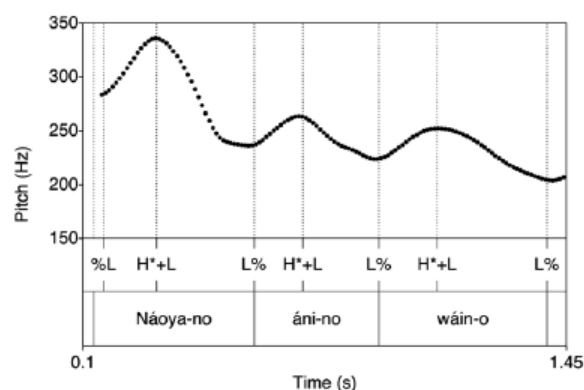
- (40) a.   $L_{\Phi} H_{\Phi}$   
           | |  
 a.  $(garasudama)_{\Phi}$  'glass beads'
- b.   $L_{\Phi} H_{\Phi} H^* L$   
           | | | /  
 b.  $(kake-ro)_{\Phi}$  'break-off'
- (41) a.   $H^* L$   
           | |  
 a.  $(hasi-ga)_{\Phi}$  'chopstick-NOM'
- b.   $L_{\Phi} H^* L$   
           | | |  
 b.  $(hasi-ga)_{\Phi}$  'bridge-NOM'

Phrasing depends on the presence of an accented word: each accented word defines a so-called

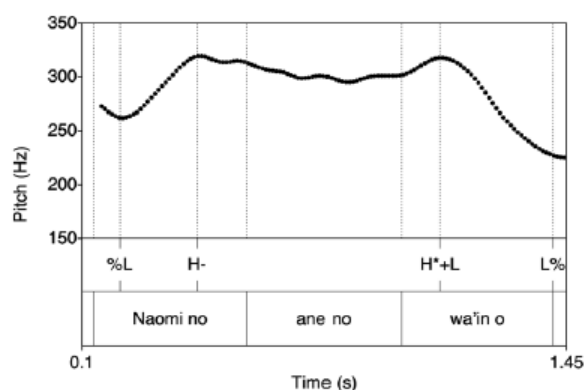
minor phrase (or minimal  $\Phi$ -phrase for Ito & Mester 2012)

- (42) (siró-i) $\Phi$  (umá-no kubiwa) $\Phi$  = a. [[siró-i umá-no] $_{NP}$  kubiwa] $_{NP}$   
 white-INFL horse-GEN collar 'the collar of the white horse'  
 b. [[siró-i] $_{AP}$  umá-no kubiwa] $_{NP}$   
 'the white collar of the horse'

- (43) a. ((Náoya-no) $\Phi$  (áni-no) $\Phi$  (wáin-o) $\Phi$ ) $\Phi$   
 Naoya-GEN big.brother-GEN wine-ACC  
 'Naoya's big brother's wine'



- b. (Naomi-no ane-no wáin-o) $\Phi$   
 Naomi-GEN big.sister-GEN wine-ACC  
 'Naomi's big sister's wine'



**Fig.5** Japanese. AAA sequence, left, and UUA sequence, right (from Ishihara 2015:572)

As in Swedish, the sentence intonation of Japanese is derived compositionally from lexical tones, phrase accent and boundary tone. Additionally, phrasing is based on the kind of lexical tones present in the sentence.

## 6.2.2 Turkish (Levi 2005, Kamali 2011)

- (44) Unaccented words  
 [év] house 'house'  
 [ev-lér] house.PL 'houses'  
 [ev-ler-ín] house.PL.2ND.POSS.SG 'your houses'  
 [ev-ler-in-dé] house.PL.2ND.POSS.SG.LOC '(they are) in your houses.'  
 [ev-ler-in-de-kí] house-.PL.2ND.POSS.SG.LOC.PRON 'the one in your houses'  
 [ev-ler-in-de-ki-lér] house.PL.2ND.POSS.SG.LOC.PRON.PL 'the ones in your houses'  
 [ev-ler-in-de-ki-ler-í] house.2ND.POSS.SG.LOC.PRON.PL.ACC 'the ones in your houses'

- H\*L  
 | |  
 (45) pásta-cu-lar-ımız-da (accented word)  
 cake-DER-PL-POSS1SG-LOC  
 'among our cake chefs'

- (46) Examples of minimal pairs from Levi (2005)  
 Mísir 'Egypt' misír 'corn'  
 bébek 'name of a suburb of Istanbul' bebék 'baby'  
 jázma 'don't write!' jazmá 'writing'

- (47) a. idiosyncratically stressed affixes -*ı*yor 'progr' -*ındı*e 'when' and -*erek* 'by'  
 b. pre-stressing suffixes: -*me* 'neg', -*de* 'also' -*ma* 'neg'

- (48) a. yönlendir-iyor  
direct-PROG 'is directing'  
b. yönlendir-me-meli  
direct-NEG-NEC 'should not direct'

Combination of two pre-accenting suffixes –'mA (verbal negative marker) and -'ti (past auxiliary): the leftmost stress survives (see also Basque).

- (49) a. sinirlen-ed<sup>3</sup>ék 's/she will become irritated'  
b. sinirlén-me-jedzek 's/she will not become irritated'  
c. sinirlen-ed<sup>3</sup>ék-ti 's/she will have become irritated'  
d. **sinirlén-me-jed<sup>3</sup>ék-ti** 's/she will not have become irritated'

- (50) a. fabrika 'factory' + bad<sup>3</sup>á 'chimney' → [fabrika bad<sup>3</sup>a-sɪ]<sub>0</sub> 'factory chimney'  
b. ayak 'foot' + kap 'cover' → [ajak kab-ɪ]<sub>0</sub> 'shoe' (lit. foot cover)

## 7. Words with lexical tone: tone languages

Hyman's (2006:229) definition for a tone language: 'A language with tone is one in which an indication of pitch enters into the lexical realisation of at least some morphemes.'

### 7.1 Tones in African tone languages: autosegmental tradition (*tone autonomy*)

Welmer's and Hyman's (2006:229) definition for a tone language: 'A language with tone is one in which an indication of pitch enters into the lexical realisation of at least some morphemes.'

What is variable in tone languages:

- the kind of tones: level tone vs. contour tone + complexity
- the number of tones. Up to six level tones, and even more contour tones
- the TBU (tone bearing units): moras or syllables
- the number of TBUs specified for tones in a word
- number and kind of changes in tones (tone sandhi, tone doubling, shifting, Meeussen's rule and many more)

In Asian languages, tones are parts of the specification of morphemes: less autonomy of tones than in African languages.

Register phenomena are frequent, as are boundary tones, but not much changes as those in Tables 1 and 2.

Autosegmental representation of tones: Leben (1973, 1978), Goldsmith (1976) and Williams (1976) for African languages like Mende, Igbo and Ewe.

Leben (1973): words in Mende, a Mande language from Sierra Leone, have melodies: high (H), low (L), falling (HL), rising (LH) and rising-falling (LHL)

- |      |        |     |             |       |            |         |                |
|------|--------|-----|-------------|-------|------------|---------|----------------|
| (51) | a. H   | kó  | 'war'       | pélé  | 'house'    | háwámá  | 'waistline'    |
|      | b. L   | kpà | 'debt'      | bèlè  | 'trousers' | kpàkàlì | 'tripod chair' |
|      | c. HL  | mbû | 'owl'       | ngílà | 'dog'      | félàmà  | 'junction'     |
|      | d. LH  | mbă | 'rice'      | fàndé | 'cotton'   | ndàvúlá | 'sling'        |
|      | e. LHL | mbă | 'companion' | n'àhâ | 'woman'    | nìkìlì  | 'groundnut'    |

Tone mapping conventions to the effect that the first tone is associated with the first syllable, the second tone with the second syllable, and the third tone with the third syllable. If there are more

tones than syllables, tone crowding takes place.

- (52)
- |        |         |           |             |               |
|--------|---------|-----------|-------------|---------------|
| L<br>  | H<br>/\ | L HL<br>  | L HL<br>  V | L H L<br>\\ / |
| a. kpà | b. pélé | c. níkíli | d. n'áhâ    | e. mbã        |

The Obligatory Contour Principle (OCP) disallows successive identical tones and forces dissimilation of adjacent tones, as required by Meeussen's rule among others.

- (53)
- |                    |             |
|--------------------|-------------|
| L H<br>  /\        | L H H<br>   |
| a. ndàvúlá 'sling' | b. *ndàvúlá |

(54) Meeussen's rule (1970)

$H \rightarrow L / H (\#) \_$

(55) Meeussen's rule in Shona

- |                     |   |                |                         |
|---------------------|---|----------------|-------------------------|
| a. né # bwá         | → | né bwa         | 'dog, with a dog'       |
| b. né # hówé        | → | né hove        | 'fish, with a fish'     |
| c. né # hákáta      | → | né hakata      | 'with the bones'        |
| d. né # bénzíbvunzá | → | né benzibvunzá | '(with a) curious fool' |
| e. né # badzá       | → | né badzá       | 'axe, with an axe'      |

(56) Tone stability in Etsako (Kwa) from Odden (2005:303)

- |              |   |         |  |
|--------------|---|---------|--|
| a. ídzé élà  | → | ídzélà  | 'three axes'                             |
| b. èké élà   | → | èkélà   | 'three rams'                             |
| c. údzé òkpá | → | údzòkpá | 'one axe'                                |
| d. òké òkpá  | → | òkòkpá  | 'one ram'                                |
| e. ówà ówà   | → | ówòwà   | 'every house' (textually: 'house house') |
| f. ídù ídù   | → | ídwìdù  | 'every lion' (textually: 'lion lion')    |

- (57)
- |             |   |             |   |               |
|-------------|---|-------------|---|---------------|
| L H L H<br> | → | L H L H<br> | → | L HL H<br>  \ |
| òké òkpá    | → | òk òkpá     | → | òkòkpá        |

(58) Morphemic floating tones with case-marking and modified nouns in Angas, a Chadic language from Nigeria (Odden 2005:315)

Stem	Case-marked	Modified	
	+H	+L	
a. téŋ (H)	téŋ	têŋ	'rope'
b. n'í (H)	n'í	n'î	'elephant'
c. ʔās (M)	ʔās	ʔâs	'dog'
d. mās (L)	mās	mâs	'locust bean'

Some languages also have morphemes without tones: tone is acquired by assimilation or spreading from the preceding word (see Leben 1973, 1978 for examples from Mende).

Welmers (1959): languages with downstep triggered by a floating L 'terraced-level':

- (59)
- |  |   |
|--|---|
| H <sup>l</sup> H<br>     ^               | H <sup>l</sup> H<br>^                   |
| a. ní <sup>l</sup> n'óká 'it is a snake' | b. n'óká <sup>l</sup> dú 'only a snake' |
| H <sup>l</sup> H <sup>l</sup> H          | H <sup>l</sup> H <sup>l</sup> H         |
- HL

c. ní 'ngó<sup>1</sup>tó 'it is a sheep'      d. ngó<sup>1</sup>tó 'dú 'only sheep'      e. kúi 'dog'

## 7.2 Asian tones

What is variable in tone languages:

- the number of tones
- the kind of tones: level tone vs. contour tone + complexity
- the TBU (tone bearing units): moras or syllables
- the number of TBUs specified for tones
- number and kind of changes in tones

In Asian languages, tones are parts of the specification of morphemes: less autonomy of tones than in African languages.

### 7.2.1 Invariance of lexical tone in Cantonese

All syllables carry a tone

Register	Level CV(N)	Level CVq	Rising	Falling
a. high (yin)	33	55, 33	35	55/53
b. low (yang)	22	22	23	21

**Table 4.** Cantonese lexical tone system according to M. Chen (2000:16)

(60) Unchecked tones				Checked tones			
55 (~53)	H	si	'poetry'	55	Hq	sɪk	'to know'
33	M	si	'to try'	33	Mq	sɛk	'to kiss'
22	L	si	'affairs'	22	Lq	sɪk	'to eat'
23	LM	si	'market'				
35	MH	si	'to cause, make'				
21	ML	si	'time'				

(61) *Pinjam* 'changed tone' in Cantonese (M. Chen 2000:32ff, Yu 2007): one of the very few tonal processes in the language

a. Level tone	b. Rising tone
sou33 'to sweep'	sou35 'a broom'
pɔŋ22 'to weigh'	pɔŋ35 'a scale'
wɔ22 'to listen'	wɔ35 'an utterance'
mɔ11 'to grind'	mɔ35 'a grind'
ts <sup>h</sup> ɔ11 'to plough'	ts <sup>h</sup> ɔ35 'a plough'

### 7.2.2 Tone invariance and tone sandhi in Beijing Mandarin

See Table 3 for the lexical tones

- (62) a. you-deng 'oil lamp'      b. tjan-hwaa 'telephone'  
        35 55                              51 51
- c. paa-paa → paa-pə 'dad'  
        51 51                      51 -

(63) 'Dual vocabulary' (Duanmu 2007).

- a. dian or shang-dian '(business)-store'  
 b. cai or shu-cai '(vegetable)-vegetable'  
 c. zhong or zhong-zhi 'to plant-(plant)'

Beijing Mandarin has a Tone 3 sandhi rule (T3 → T2/ \_\_ T3)

- (64) a. xiao 'small' + gou 'dog' xiao gou 'puppy'  
           214               214               →   35 214  
       b. mai 'buy' + ma 'horse'       mai ma 'to buy a horse'  
           214               214               →   35 214

T3 sandhi is cyclic. It is regulated by morphosyntactic structure, and depends on emphasis and speech style. The conditions of its application are complex.

- (65) a. [lao-hu] 'tiger' + dan 'gall'       lao-hu dan 'brave'  
           214 214               214               →   35 35 214  
       b. zhi 'paper' + [lao-hu] 'tiger'       zhi lao-hu 'coward'  
           214               214 214               →   214 35 214

- (66) Left-branching syntactic domain: tone sandhi applies twice  
       mai 'buy' + hao 'good' jiu 'wine'       [[mai hao] jiu] 'finished buying wine'  
       214               214               214               →   35 35 214 (but \*214 35 214, \*35 214 214)

- (67) Right-branching syntactic domain: tone sandhi may apply only once or twice  
       mai 'buy' + hao 'good' jiu 'wine'       [mai [hao jiu]] 'to buy good wine'  
       214               214               214               →   35 35 214 or 214 35 214 (but \*35 214 214)

### 7.2.3 Variance of tones in Shanghai (M. Chen 2000:307).

Basic Pitch Shape	Examples
A. 53 (HL)	to 'knife'
B. 34 (MH)	to 'island'
C. 23 (LH)	do 'peach'
D. 5q (Hq)	toq 'sincere, earnest'
E. 12q (LMq)	doq 'to read'

**Table 5.** Shanghai lexical tones

- (68)       se   pe '3 cups'       se pø '3 plates'       sz   pe '4 cups'       sz   pø '4 plates'
- |          |    |    |       |       |       |
|----------|----|----|-------|-------|-------|
| Citation | 53 | 53 | 53 53 | 23 53 | 23 23 |
| Deletion | 53 | -  | 53 -  | 23 -  | 23 -  |
| Surface  | 5  | 3  | 5 3   | 2 3   | 2 3   |

- (69)       ×                               ×  
           (( × . ) ( × . ))               ( × . . . )  
       ?o ta li ya 'Australia' → ?o ta li ya  
           (( 34 - ) (23 - ))               ( 3 4 - - )  
           (( 3 4 ) (2 3 ))

- (70)       ×                               ×  
           ( × . )       ( × . )  
       a. (ʔɿ jǎ       ɕo zɿ )  
           (53 - )       (34 - )  
           (5 3 )       (3 4 )

Ou-yang professor 'Professor Ou-yang'

×		×
( × )	( × . )	( × . . )
b. (wǎ    ǎo    zǐ) →		(wǎ   ǎo-zǐ )
(23)   (34   - )		( 2   3   - )
Wang   professor		'Professor Wang'

	×	×	Compound stress
	( × . ) ( × )	( × ) ( × . )	Word stress
(71)	a. [hǒ moq] zǎ	b. hǒ [moq zǎ]	
	2323 23	23 23 23	Underlying tones
	(2 3) (23)	*(23) (2 3)	Tone deletion/association
	(2 3 - )	(2 3 - )	Clash Resolution
	redwood bed	red wooden bed	

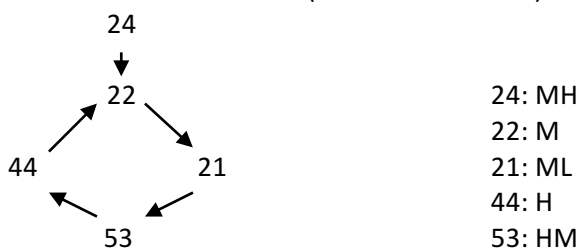
Shanghai deletion and re-association of tones reflect a morpho-syntactically motivated prosodic constituency. Shanghai has both tone and stress. Tone is defined on all syllables, but stress is culminative.

#### 7.2.4 Xiamen Min circle: Xiamen, a South Chinese Min Nan language spoken in Taiwan

Basic Pitch Shape	Sandhi form
44 (H)	22
24 (MH)	22
22 (M)	21
21 (ML)	53
53 (HM)	44

Table 6. Xiamen lexical tones

(72) Southern Min Tone Circle (M. Chen 2000:433)



(73)	Underlying tones	Tones after tone sandhi
	tsin <u>p'ang</u> 'very fragrant'	<u>p'ang</u> tsui 'perfume' (fragrant + water)
	44	22
	p'e <u>we</u> 'leather shoes'	<u>we</u> tua 'shoe laces'
	24	22
	wi <u>pĩ</u> 'stomach ailment'	<u>pĩ</u> lang 'sick person'
	22	21
	k'i <u>ts'u</u> 'build a house'	<u>ts'u</u> ting 'roof' (house + top)
	21	53
	tua <u>hai</u> 'big ocean'	<u>hai</u> kĩ 'ocean front'
	53	44



## 8. Tonogenesis

Haudricourt's (1954) model of how tones arise has been extremely influential

Final consonants determined contours and initial consonants (voicing of the preceding C) determined the pitch height: a voiced stop is a *depressor*.

(74)	Following C: (proto- Vietnamese)	CV <u>h</u> , CV level	CV <u>g</u> rise	CV <u>s</u> fall		
(75)	Preceding C: (proto-Vietnam.)	<u>p</u> V high-level <i>ngang</i>	<u>b</u> V low-level <i>huyền</i>	<u>p</u> Vq high-rise <i>sắc</i>	<u>b</u> Vq low-rise <i>nặng</i>	<u>p</u> Vs high-fall <i>hỏi</i>
						<u>b</u> Vs low-fall <i>ngã</i>

Scandinavian languages, stress configurations in late Proto-Nordic, between 800 and 1200 ce (Riad 1998, 2003, Kingston 2011),

(76)	* dǫð, mǫn	→	dǫð.ma	'to judge'
	* wúr.ðòo	→	wór.ðu	'words.NOM/ACC PL'.

The newly light syllable lost its stress, but retained its pitch properties, thus giving rise to a double pitch peak on a sequence of two syllables (accent 2).

## 9. Conclusions

- Stress is an abstract property identifying one syllable or one mora in a word as the most prominent one (and optionally secondary ones) . It is best accounted for by metrical properties of  $\omega$ -words. Stress can be realised in different ways, or remain unrealised when it is in the postnuclear position.
- Lexical tone is always realised by a concrete tonal pattern, it can be a level or a contour tone. Languages can contrast one or more tones. Tones can change their form (in sandhi contexts or others) or be largely invariant.
- In pitch accent languages, stress and tone combine. There, the realisation of stress is not dependent on sentence intonation as in pure intonation languages: it is dependent on the underlying tonal structure of the  $\omega$ -word.
- Some languages lack both stress and tone, like French, Berber, West Greenlandic and Bella Coola. These languages assign their tonal structure at the level of  $\Phi$ -phrase and  $\iota$ -phrase only, not at the level of the  $\omega$ -word.
- Tone languages can have stress or not.

## Exercises

1. Draw the prosodic constituents on some words and sentences in English and in another language of your choice. Does the Strict Layer Hypothesis make the right predictions?

2. Gordon (2003, 2005, 2014) shows that beside a limited number of morpholexical high-toned pitch accents in a subset of verbs that we do not address here, Chickasaw distinguishes what he calls 'word stress' and 'pitch accent'. Stress is not phonemic, but rather assigned 'top down', on heavy syllables, or final syllables. Primary stress falls on the rightmost long vowel, or on the final syllable. /tala:nompə?/ 'telephone' has three heavy syllables, and only one long vowel. The resulting stress structure is [talá:nòmpà?]. Moreover, in a sequence of two open syllables with short vowels, the

second syllable is rhythmically stressed and becomes half-long (and heavy): /pisalitok/ 'I looked at it' → [pisá·litòk]. /tífo/ 'medicine man' has final stress [tífó]. A high pitch accent H\* appears at the end of an ι-phrase. In a simple statement, H\* is simply located on the last syllable, cancelling primary stress: [talà:nòmpá?]. At the end of an interrogative ι-phrase, H\* is generally located on the penult: [talà:nómpà?] and [kata:t tífo]? 'Who is a medicine man?' are the results. Discuss the resulting difference in accent structures depending on their position in the Φ-phrase and ι-phrase in comparison with English, where word stress is never cancelled. How is this difference accounted for? Can we really talk of 'word stress' in both cases?

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